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AVIATION

Published by McGraw-Hill Publishing Company, Inc.

THE AVIATION AMERICAN AERONAUTICAL MAGAZINE

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McGraw-Hill Publishing Company, Inc.

Published by McGraw-Hill Publishing Company, Inc.
220 W. 42nd St., New York 36, N.Y.

John F. Zull, Jr., Managing Editor
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Business Office: 120 W. 42nd St., New York 36, N.Y.
Subscription Office: 120 W. 42nd St., New York 36, N.Y.

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AVIATION for August, 1936

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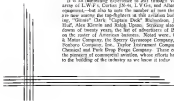
**TWENTY
YEARS AGO—**

Americans were born. Among our most valued possessions is a yellowing scrap of paper on which Lester Gardner wrote for the first time the name of the new publication. Among our records there is some more interesting than that part of his last editorial in the first issue in which he stated the aims of the enterprise, a program from which his successors have never departed, and which stands today as a basic policy of the paper.

"Aviation... intends to assemble the most accurate of (current) information and make it useful to the constructor, the engine maker, the aviator and the sportsman. It will follow construction both abroad and in the United States, and present the latest developments in scientific, scientific and related items. By recording the work of American aeronautical engineering, the world will soon be made aware that the heritage of the airplane is still maintaining its leadership in aeronautics."

Historically speaking, twenty years is a short time. But in aviation, the last two decades span almost the whole history of powered aircraft. Prior to the outbreak of the European War all 1914 designs and construction were rapid and wonderful things. Nevertheless it is difficult to realize how little was then known of the fundamentals of aerodynamics. The astounding variety of forms then appeared on pre-War aeroplanes gives grounds for suspicion that an ounce of insight might have been the most useful tool of the designer's kit. By 1915, however, the airplane was beginning to emerge from the fairy houses of war as a tempered and refined form. The ideas of engineers and visionaries simply would not stand up under the test of military necessity. Scientific research disclosed the heritage of Jules Verne, and the ounce yielded to the able rule. It was at this stage that Aviation began its first twenty years of service to the new-born industry.

It is an interesting experience to look through Volume One, not only to survey the array of L.W.F.s, Curtiss (28-4), L.V.G.s, and Albatrosses, then the last word in flying equipment—but also to note the number of men then appearing as young authors who are now among the top-fighters in this aviation business. Among them: Orville Lowery, "Glimpse" Clark, "Captain Cook" Richardson, Jerry Thomsen, Ed Weyling, Tom Huff, Alex Klemke and Ralph Upson. Striking also considering the enormous size and down of twenty years, the list of subscribers of 1916 whose names are still included on the roster of American business. Noted were: Glenn L. Martin, Curtis Aircraft & Motor Company, the Sperry Gyroscope Company, Goodyear, U.S. Rubber Company, Packard Corporation, Inc., Taylor Instrument Company, Moto-Motor Company, DuPont Chemical and Pirelli Drop Pumps Company. These eminences are to be numbered among the pioneers of commercial aviation, whose efforts have contributed in no small measure to the building of the industry as we know it today.



Then it would be decidedly misleading to limit our search for pioneers to the pages of the original issues of *Aviation*. Even one of Editor Carder's outstanding ability as a publisher could scarcely have hoped to attract to his young and struggling sheet all the available talent at the period as contributors, or all the firms then in business as advertisers. From other publications—discussions, club books and magazines—from old files and by substitution of information from interviewers, we have assembled a haphazard picture of the period. It is presented only as a series of snapshots.

The late American Society, Carder from 1910



The late Charles Wright, Editor of *Aviation*, 1910-1915



Reginald E. Gilman when he was then, president of *Aviation*



Thomas Morgan shortly after he had been elected to go to Europe

shots and is not in any sense a balanced record of the twenty years since. Others have done that for better than we could hope to do in the space at our command. Admittedly, too, our picture is probably far from complete. Reviews have been laid and old pictures have faded. To those who have been inadvertently omitted our apologies. After all, they have already written their own records in some enduring staff that posterity will see.

Although we are discussing our attention chiefly to the period 1916-17, it is only fitting that tribute be paid to passing to these earlier pioneers of American aviation from whose efforts all subsequent activities have stemmed. Latham and Denham. We give you the Brothers Wright, first companions of the air in powered machines; and Glenn Curtiss, whose mechanical genius is responsible for many of the essential features of our present aircraft.

By 1916 the name Sperry was already well established in the aeronautical world. It was only natural that this genius Elmer Sperry and his son had applied to engine navigation should be turned toward problems of aerial navigation. The Sperry Gyroscope Company of that period had not only developed and marketed magnetic compasses for aircraft, but had extended their field to cover other

In the beginning were the Wrights (left) and the Curtiss (right).



As early "Dunlop Motor" stage car spins on rolls of the prototype tire

apparatus. But early *Aviation* (Sperry Folder No. 30), including drink machine and bank, incandescent and resistance indicators. By that time work had been far advanced on automatic flight control for airplanes. Of immediate interest then was its application to the aerial torpedo but from that research sprang the modern Gyrocompass, now to be found in most and equipment on most warships.

Associated with the Sperry interests today are a number of men whose previous activities date back twenty years or more. In 1916, Thomas A. Morgan, now chairman of the board, was in charge of the aeronautical instrument department, Reginald E. Gilman, president, was managing director in London; Elmer A. Sperry, Jr., now consulting engineer, was working on aviation development with his distinguished father.

The name Curtiss is stamped indelibly on the minds of all who participated in military aeronautics during the War and in the pre-War period. The "Jenny" and the OX-5 were inseparable with the name. Their success was the nucleus Curtiss plane and engine produced at Hammondsport in 1907. Their descendants are legion. In 1919 a company of British officers in America had declared that the JH was the most perfect airplane to be developed and within a year hundreds of them were in active service in British and American training centers. By 1916 Curtiss flying boats were well developed. Following Glenn Curtiss' successful experiments of 1915, multi-engine types were in production at that time. Richard W. Wainwright, Wainwright's hope the "Aerocar" was completed and the grandchild had been laid for the "J" boats (long remembered by naval aviators of the period) and for the famous NC boats ordered to achieve fame in conquests of the Atlantic.

Parallel to Curtiss' developments of twenty years ago, another company was keeping ahead later (1925) to join aerocars with it. The years after Kitty Hawk, the Wright Company had been engendered by Orville and Wilbur. It evolved as a separate unit, supplying planes to the services and to private owners until 1916 when it was merged



Glenn Curtiss' "Aerocar" and "Aerocar" in 1915, the first multi-engine aircraft to be built in America



Charles Kingsley in one of his early airplanes



Major Raymond Webb when he was in command of the first flight



First Lt. Frank A. Williams
with engine



New York State Militia of the
Aviation from 1915



The Stinson attack plane of 1918



Two old (left) and new (right) engines
from the Stinson



Stinson in the line of the
"Stinson"



with the Marine units of Los Angeles to form the Wright-Martin Company. In 1916 the new company selected the Hispano-Suiza engine design as the most adaptable for War-time purposes and embarked on a production program. Work first concentrated on the 150 hp model but by 1918 manufacture was in full swing on the 200 hp series. A program for 1920 such engine was set for late 1919 but the War continued insisting to note that Guy Vaughn, present president

joined the company to guide company in 1916. Following the War the Wright-Martin Company was dissolved with the Wright Aeronautical Corporation taking over all work on engine-land (1922) by purchase the company secured the services and experience of Charles E. Lamson, who had been engaged in the manufacture of air-cooled engines since 1914. Two and three-cylinder models had appeared and had been used during the War, but it was not until several years afterward that both Army and Navy became sufficiently interested in radial types to accept new development. The results of the Lamson-Wright collaboration are well known. Wrights and Co. designs power most modern aircraft. It was a Wright who's current Charles Lindbergh in Paris and to date in 1927.

Although the present Consolidated Aircraft Corporation (then Doug Cold) dates only from 1935, when a unit located in Buffalo by Mr. Ruben Fleet one of its assignment parts—the Thomas-Martin Aircraft Corporation, was an important production unit in 1915. "Tommy Martin" engines and engines were widely used on military flying fields at the War and post-war period. Among those who constructed with Consolidated, however, are many whose aviation activities were the company's period. Major Fleet, then a member of the Washington State Legislature, was active flight training which led to his pilot's license early in



A Stinson line with a Stinson engine



The Stinson E. Martin to Martin in flight



Stinson Wright and Stinson
E. Martin

1927. C. A. Van Dusen, now vice-president and sales manager working in Glenn Martin's Los Angeles design in 1946. "Mac" Laidler, vice-president and chief engineer, was just on the point of leaving a long-standing connection with the Cadillac Motor Car Company at Detroit to start aviation. J. L. Kelly, factory superintendent, was then engaged in the aviation and disposal of popular lumber in Canada for the French Government, while Edgar N. Galt, assistant to the president, was, in 1915, one of the members of the corporation of Pacific Air Products Corporation, later the Boeing Airplane Company.

Among the partners of 1916 who are still active in the business is C. B. Kirkham. An engine designer for many years (he turned out his first design—for a motorcycle—in 1900), he was responsible for the famous OX-5 in 1915 and the V-2 in 1916 in his capacity as engineer for Curtiss Aeroplane & Motor Corporation. In 1917 he is credited with building the first supercharger for aircraft engines in America. He is also an airplane designer of note, his work including his own ship in 1914 the Curtiss 18-T biplane and a airplane later the L. A. Williams in 1928. He is now engaged in the manufacture of engine and special aeronautical parts at his Farmingdale (L. I.) plant.

The private Great Aircraft group, although its own corporate history does not date back to the early days outside its in private interests several units that were in business twenty years ago and many "early birds" are still listed among its officials.

Earl's expansion was the old Thomas Propeller Company organized in Seattle in 1909 by Thomas F. Hazen, himself a pilot at that time. In 1914 he moved the plant to St. Paul, later to be consolidated with the Standard Steel Propeller Company of Pittsburgh to form Hazen-Standards, largest manufacturer of propellers

in the world. Mr. Hazen was now a vice-president and director of United Aircraft Corporation. Raymond White, president of Hazen-Standards, called the War a major in the Air Corps. At one time he was in command of Prisoner Field in the Canal Zone. Thomas M. Wright (who died in 1920) acquired the original Wright Company stock in 1917. He specialized in ships for the U.S. Navy, and today the products of the present Thomas Wright Division are found on board most of our naval ships.

After J. Stinson began his work in aviation in Russia as far back as 1908 with a design for a helicopter. He produced his first airplane in 1910, and had a string of successful ships to his credit before 1906. By that date he had established himself as an outstanding contractor to the Russian Government, producing several million-dollar airplanes of remarkable size and performance. Based out of Russia by the revolution in 1917, Mr. Stinson went to France where he began his own design for the French Government. In 1919 he transferred his activities to the United States where he has established himself a worldwide reputation as a producer of large and efficient aircraft.

Among the shareholders now in United Aircraft... Frederick R. Remondet, chairman of the board, was Captain in the Army and an aviator at the old Wright-Martin plant in 1917. Donald L. Brown, president, was with Wright-Martin during the War... George J. Maule, vice-president and chief engineer of Dusen & Whitney was an engine designer at McCook Field twenty years ago... Eugene E. Williams head of the Hazen-Standards Division, also senior vice president and director of United Aircraft, supervised the manufacturing and control section of the Great Lakes Training Station in the early days and spent with the Wright firm during the later part of the War... Bernard L. Whitson, general manager of United Aircraft first joined in 1912 as old Wright engineer, and he has been previously engineering with Wright since... Glenn L. Martin built his first airplane in 1909 and he has been at it ever since. His first factory was established that year at Santa Ana, Cal., and in 1915 he moved to his first plant in the U.S. Army. In the period 1912-15 the company produced airplanes for the United States as well as for the governments of Holland and the Netherlands East Indies. Models then in production



Charles E. Kestner and Clarence L. Johnson, former U. S. Warrents

Colman's award, the Wright F medal

From Martin's report: "The Wright F medal"



Viewpoint of engine—the two-cylinder engine engine

were the TA (a 180 hp turbo), the S (a 325 hp turbo) and the R (a 325 hp and turbocharger plane). In September, 1935, Mr. Martin assisted in the formation of the Wright-Martin Aircraft Corporation, but withdrew shortly to form his own company in 1937. His original plant was in Cleveland, Ohio, later moved to the present magnificent layout near Baldwin. Long time a contractor to the Army and Navy, Martin entered the commercial field in 1935 with delivery to Pan American of three large flying boats (Model 135) now in Transpacific service.

George H. Bellanca is another designer who was very active by 1905. He began his flying in 1905 in Italy, and by 1911 had completed his first airplane and had taught himself to fly in it at Manassas, L. I., U. S. A. Late in 1915 his airplane was still being used by students at Manassas. Major LaGrange of New York learned to fly in it. In 1916 Mr. Bellanca joined the Maryland Pattern Steel Company in developing two military types for the Army Air Corps, but the War was over before these airplanes were placed in service. A lot of Bellanca records during the last twenty years is impressive and much too long to reproduce here. Suffice it to say that Bellanca-built machines have been outstanding performers where long-range and ability to carry load was a primary requirement.

Twenty-first anniversary of the Boeing Aircraft Company coincides with that of Armstrong. In those twenty years the company has produced 2,000 airplanes of 62 different types. In 1936 the first unit of Boeing's factory was built on Lake Union in Seattle (in 1947 operations were moved to the new building shown in one of the accompanying photographs). The first production airplane turned out was the Model B & W, shortly followed by the C-4, a airplane built in 1917 named the Navy. Early in 1917 30 machines of this type were ordered. Early in '17 the organization began to grow. Among those who signed on at that time and are still with the company

A Boeing airplane of the 1917 class, with J. C. Martin in the rear cockpit



Boeing airplane of the 1917 class, with J. C. Martin in the rear cockpit

Bill Boeing flying with the first Canadian air mail in 1919

AVIATION

BACK in the days of wing ailerons, wires, and "unhinged" stable airfoils, a group of scholars at M.I.T. intended to the enthusiastic exposition of a plan to accelerate the arrival of aviation's future. The name of the man with the idea was Lester Goodson. The idea was AVIATION. Thus this publication was founded in 1916, as *Aviation and Aeronautical Engineering*. In 1920 the *Aircraft Journal* was absorbed and the title became *Aviation and Aircraft Journal*. This was simplified to AVIATION in 1923.

In 1927 came the first change in ownership. The new publisher was Earl D. Osborn, founder and president of Eds. Osborn Corporation. In 1929 the publication was again sold, this time to the McGraw-Hill Publishing Company.

Past chief editors of AVIATION have been Leslie G. Gray, W. Lawrence LePage, Earl D. Osborn, R. Osborn Brown, Jr., and Edward P. Warner.



were C. I. Eptvek, now president, who came in as a stress analyst; Philip G. Johnson, now vice president of the Boeing Company and subsequently president of United Aircraft Corporation; Louis Clark, analyst and engineer, who entered as a draftsman; and John Wilson, now chief inspector, hired as test pilot.

Largest part of Boeing's output has gone to the Army and the Navy, but in 1925 Boeing entered in the production of large transport airplanes, the 401 A, and, in 1933 delivered to United Air Lines the prototype of all modern transports, the Boeing 247.

No set of plastic companies would be complete without mention of the Aeroelastic Plane & Motor Company, now of Kew-Forest, N. Y. Its activities date back far beyond the War period. By 1915 I. M. Oppenheim was vice president, and Charles Day, later to achieve fame with the Standard and New Standard Companies, was his chief engineer. In 1916 it was producing an engine of the water-cooled inline type as well as several varieties of land and water aircraft. Shortly after the War several large flying boats were built which were used on one of our first commercial air lines. In later years Vincent Suerdick became associated with Mr. Oppenheim in developing a series of large airplanes characterized by swept shaped tailfins.

Several years before Wilhelm's "black gold" began to gush into existence was the product of "Piper" Mothbender



The founder, Earl D. Osborn



Earl D. Osborn, who published AVIATION from 1927-1929



Present publisher, James H. McGraw, Jr.

showed him that the most aerodynamically efficient monoplanes would differ widely from the ones in current production. Here there was the situation which brought grottoe construction into existence.

Optimum Monoplane

His investigations showed that the desirable characteristics of a monoplane should be: (1) aspect ratio between 9 and 15; (2) wing root depth-chord ratio not greater than 17 per cent; (3) great increased rigidity of wing; (4) great stiffness and torsional rigidity of fuselage; and (5) very light structural weight.

Frontal area and two are necessarily. The selection of the monoplane form of high aspect ratio is based upon the theory that the drag of a plane may be approximately represented by a cylinder of diameter equaling the wing span.

The high aspect ratio monoplane is, therefore, the form best suited to modern performance requirements. Furthermore, for maximum efficiency, the wing section must be relatively thin. No stressed skin monoplane has been produced which meets both conditions and reduction suggests that to stressed skin monoplane can be no built within an economical weight limit. When the wing root thickness-chord ratio is held constant, it can be shown that with any given form of construction, the weight of a wing of constant area and wing loading will be designed for equal speed stress density factor than the square of the aspect ratio. That is the present laws taken by the well known "cube law" of structures.

According to theory the weight of a geometrically similar structure goes up as the cube of the linear dimensions, but inasmuch as such things as control rods and ailerons increase only slightly in weight, actually the weight goes up somewhere between the square and the cube of the dimensions. Thus, if two wings of constant area, loading, aspect ratio and thickness chord ratio have aspect ratios of 6 and 9 respectively, then, in a given construction, the wing of aspect ratio 9 will weigh $(\frac{9}{6})^2 = 2.25$ times the weight of the wing of aspect ratio 6. The result is that if aspect ratios sufficiently great to enable the monoplane form to be utilized, best advantage can be to be employed, a very light construction is essential. But points (3) and (4) above must also be borne in mind, because lack of torsional rigidity is a very real defect which at some critical speed and to buffeting.



Top section of a grottoe fuselage

Mr. H. H. Ford, of the Lockheed Aircraft Corporation, read a valuable paper before a German Aeroelastic Society in which he quoted a typical stress ratio of the aspect ratio of modern monoplanes of the order of 6. Compare this with the 9 to 15 figure demanded desirably to meet the requirements laid down by Mr. Wiggins. Stressed skin construction has been widely adopted in order to obtain torsional rigidity at high speeds, but actually built in this way usually possess only the minimum factor of strength necessary to secure a criterion of aerodynamicity. Mr. Wiggins demonstrates that structural need in the form of a skin is in the worst form for resisting load, although its position in the structure is the best. Related need is the concentrated form of ribs, bars or tubes is capable of developing far higher strength than when in plate form. Stressed skin constructions may therefore change between a plus factor of safety, with its consequential loss loading on the aircraft, or a very heavy structure.

As brief, intelligible showed that progress in performance may be made by structural functions. The grottoe construction is the method advanced by Mr. Wiggins to clear the way.

Why "Grottoe"?

A grottoe line may be defined as the line that will be taken up by a flexible string when subject to stress over a curved surface between two points lying in that surface. An alternative definition is: A grottoe line is the shortest distance between any two points in a curved surface, where the path lies wholly in the surface. The word grottoe in the aircraft grottoe is derived from the grottoe in the cave.

Grottoe construction gives the minimum stressed by the stressed skin wing to the advantage position of the material, and at the same time it gives the strength obtained by stressed material in the form of bars or tubes. Such con-

structed members lie wholly on the curved surface of the body and are not subject to the stresses that would be on the surface. We now see the reason for the diagonal pattern formed by the web of grottoe members, under the covering of the wing. The internal lines of the members are arranged as grottoes in the curved surface of wing and fuselage. If you take along inside a grottoe fuselage you can see these curves more plainly than in a wing. The members must round and round, even use one end and forming a sort of two-way speed.

This spiral is a system of balance such grottoes belonging to the form. And it is important to note that the balance is not necessary. There is no lag while loads are being stressed. The structure is still in tension. There have been many attempts to produce ship hulls for the Royal Air Force, the Victoria Whiskey and the new Victoria two-engine bomber, which, at the time of writing, is in progress and which will make its first public appearance at the Royal Air Force Display at Hendon Aerodrome on the 29th June.

Performance Improved

Calculation shows that if the load of the Victoria was divided entirely so that, a distance of 5,000 miles could be flown non-stop to still air, or much greater than the existing world's record. A direct comparison with a machine of similar construction shows that grottoe construction enables the loaded load to be increased by 200 to 300, the top speed from 345 m.p.h. to 350 m.p.h., the cruise speed from 17,500 ft. to 21,400 ft., and the cruise from 160 miles to 1,200. All the above end of the scale, the loading speed goes up only from 38 m.p.h. to 40 m.p.h. In other words, there has been increased 2 1/2 times and performance in general has been advanced with but negligible increase in loading speed.

It is worth recalling that the Farry Monoplane (Farry engine) that was especially built for maximum range, but constructed along conventional lines, was designed for a range of 5,000 miles, then about the limit of possibility. Mr. Farry said at the time (1929) that extension of the endurance would have increased the range by about 3,200 miles. The grottoe construction has enabled a machine to be built, not so different in range, but for Army cooperation duties, which puts the whole matter into a different perspective, and which naturally raises the hope that is regarded as the absolute limit of possibility.

Two more features of grottoe construction remain to be mentioned: its ability to meet the modern demand for strength obtained by stressed material in the form of bars or tubes. Such con-

struction into the effects of rough surface upon the boundary layer, and its suitability for most production.

So far, fabric coverings have been discussed for grottoe airplanes. They may be applied directly to the grottoe members or to built structures and at the top of them. But metal as played coverings can be used equally well. Mr. Wiggins has devised a system for attaching the fabric which, in conjunction with suitable bracing, enables a highly polished surface to be obtained. The new Victoria two-engine bomber has a surface which, although showing the ridges where the structure is, is as smooth as that on stressed skin all-metal machines.

For quieter ships

An incidental advantage of the grottoe system is the reduction of light noise. It seems that the grottoe web is not resonant and that it acts as a crasher to sound.

As for the system's suitability for

mass production, methods have been evolved which I need not go into here. It seems certain that if the grottoe construction exhibits no unexpected faults, and if it gives the performance gains which calculations and the early test flights of the Whiskey and the two-engine bomber indicate, methods will be developed for producing it quickly and in quantity. Already Mr. Wiggins has obtained special issues of manufacturing budgets and wings as a series production basis.

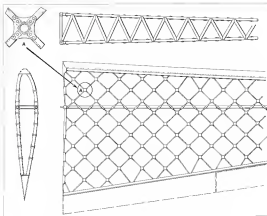
Other advantages

Among other possible future advantages of the method have been foreseen. For example, the engineers of the mode of the wing would enable a telescope form of wing to be employed. A wing of variable size would then become possible.

Another advantage to be derived from the "simplicity" of the wing or fuselage is the increased facilities for housing crew and passengers.

be many and so marked are the advantages offered by the grottoe construction, few are better in wonder whether there is not a catch in it somewhere. All that can be said at present is that no signs of any unexpected difficulties have been seen. There have been, as there must be in all new things, many minor difficulties, but nothing has occurred which tends to contradict the theory or to cast doubt upon its possibilities. All the flying that has been done and all the calculations and testing, including the load testing at Farnborough, have gone to bear out the engineer's dream. The order by the Air Ministry of the Victoria Whiskey is a proof.

It has been suggested more than once that the Whiskey should make an attempt upon the world's distance record. Even if no attempt is made, the world's record is made, the importance of the Royal Air Force operations which are to be equipped with the Victoria Whiskey should provide sufficient data to prove the claims that have been made.



Section of a typical grottoe fuselage—web supports during construction details of construction of members. The diagonal members support weight in pull and are actually critical to force the surface outward.

Records fall in 353 Hours of Soaring at Elmira

Wind and weather conspired to make this year's Elmiras meet the most active and interesting contest so far staged by the Soaring Society of America. If present plans are realized, physical facilities at the Chautauque site will be much improved for the International Contest in 1937.

LONG before what men discovered the delightful spot on which the city of Elmira now stands some shepherd of the Six Nations was so impressed with the strong and steady breezes blowing in the valley that he called it "Chewung" meaning "up here" in his language. (He did not dream that one day the white man would harness these strong winds and turn the birds over the valley. Nor did the early generations of white men who settled in the desert frontier in present destination from Grandpa Willie Rhodes, whose father's farm house was completed several years before the Civil War (about the time Willie got his first independent) had so idea that he was to be lost to vision from all over the world and that the old house would for his soaring champions. Even now he cannot quite understand why all the family should give up the privacy of their rooms and beds each year to accommodate a horde of guests who talk continuously of thermal, barometric, and weather, for the Rhodes family has thrown open the doors and cash prizes their traveling farmhome over the top of Harris Hill to company with pilots, meet officials, editors, and other curious folk, from "outside."

And the ownership of Harris Hilltop is such to pass along from the Rhodes family to the City of Elmira. Thus the new roll became eligible for a \$100,000 improvement program under W.P.A. Foundations already have been

lent for the Warren Luther Memorial, —an observation building to house the various meet activities (weather, press, medical, etc.) This year the activities on the field were housed in tents, at least many of the contestants who could not be accommodated in the nearby farmhouses and wished to be close to the scene of activity. Greatest thrills being the

test flights were the Cakergangs in which Fred Hawley, Albert Glaser and Jim and Lucinda Rhodes, who scored their two plus "Transporter" by being off the wire from the Coast to Elmira and glided further eastward through after the meet. Transporter offered an unusual opportunity for people who were not pilots to sample soaring for the first time.



In earlier times the operator's back was turned to the glider and a boy held the wire in company.

Other new steps at the meet included two of German make which arrived in this country shortly before the meeting. One, the Goepingen I, was flown by Richard C. de Font in several notable flights. The other, the Elton Dussard was operated under the sponsorship of the Elmiras Association of Germany.

Two way radio communication experiments were staged on several occasions by members of the Elmiras Amateur Radio League, which is advocating that all soaring machines be equipped with radio to facilitate communication with headquarters. Most successful of the experiments was one in which conversation was carried on between the Hill station and the "Transporter" soaring at an altitude of 3,000 ft.

A meteorological convention with the radio balloon meteorographs used by Dr. Karl Lange, director and chief meteorologist at the meet. They were used at Elmira for the first time to measure weather forecasting and performed satisfactorily. This type of meteorograph is a small radio equipped balloon which broadcasts altitude and temperature at one-minute intervals during its ascent.

Witches and Winkwinks

Four launching methods were used at Elmira, the zero-surface tow, man tow, shock cord and wind. The last three are generally familiar. The last is a comparatively recent development in this country although it has been used with different results in Germany. It has not been used extensively at earlier national meets but has been a recently popular in the east where there is considerable gliding activity under the sponsorship of members of the Associated Gliding Clubs of New Jersey, Inc. The designer and operator of the Elmiras which was Gustav Schwartz of Jersey City, vice-president of the New Jersey organization.

Which towing offers steepest possibilities because it eliminates the difficulties and risks of airplane and shock cord launching and the possibility of left rudder for auto-soaring. Water and ice on the tow car and personnel is a serious problem in operating at high speeds over the rough ground so often found at soaring sites.

The Elmiras which was not of the one-man type developed last year by the Newark Glider Club was an improved version of the earlier two-man types that have been used so extensively. Major improvement is the removal of position of the antechute so that the operator's back is no longer turned toward the braked glider. The 1,100-lb. rope passes from the rear wheel down through a hand operated guide to ensure even coiling. A second guide on the front ladder is fixed with a line



Here the new wind method. Top is broken. The operator is holding the emergency release. Closing of the safety antechute is of the rear of the glider extends into. Winkwinks between operating the entire device is handling. Bottom of photo showing the two-man starting gear.

Photo by AVIATION



Chester Becker, champion of the west

Greatest altitude, and the A. Felix du Pont prize for first to exceed the national record, *Excelsior*, 6,516 ft.

Distance (made in the Boston Express), Jay Bennett and Albert Mathis, 8 hours, 48 minutes.

Record, donated by Miss Warren Eaton, for greatest distance and return, won by Richard C. de Poot, with a flight of 18.5 miles and return. Toledo Olive Club Trophy and \$50 for greatest return distance with a return, to Henry Wightman, 135.5 mi. His top stop for *Highways* Trophy and \$50, donated by his mother, for greatest cumulative distance with a victory (167.5 miles).

Total time for the next race to 243 hours, 48 minutes, and aggregate distance on *Excelsior* exceeding the 5-mil. point-to-point maximum, totaled 1,250 miles.

The sixteen days of the next race 272 hours off.

safety device to cut the rope instantly if the release in the glider should jam. The device has a drag groove in the rope end to provide slow speed and greater power in oncoming starting winds.

The success of the 1936 contest has crystallized plans for an international gathering next year at Elmore. Invitations will be sent to all member countries of the International Aeronautical Federation for the study of modelists efforts, as well as to Britain and Japan who are not members but have been broaching interest activities. It is believed that important records could be made by American and foreign pilot teams of the world, meteorological conditions in this country which are believed to be superior to those of Central Europe. Richard C. de Poot will go to Germany and Mrs. Warren Eaton to England as members of a new flying committee of the Soaring Society to make the arrangements.

Flights and Records

Although the most got off to a slow start its opening days were marked with greater activity than those of the last year's contest. Most of the important records were made, however, during the closing week-end of July 4-5.

The prize-winning and other outstanding flights this year follow: *Excelsior* return distance (34.6 miles), which returns with the gold cup and \$500 of the Valenti-Bentley Trophy, Chester J. Decker who also won the lion's share of the A. Felix du Pont prize of \$1,000 for greatest number of points, and the Edward P. Evans Trophy signifying national championship.



R. H. H. pilot meetings were conducted by these officials. Left to right, Ed Bennett (Chester J. Decker Trophy) and Albert Mathis (Jay Bennett Trophy).



Ceremonies at Elmore. The Decker family who donated gold and trophies for many of the victories.

How one manufacturer saves

SPOT CASH

by spot welding aluminum alloys in production

By C. Weston Steward

Chrysler Aircraft Division
General Motors Aircraft Division

SINCE October 1, 1933, the Chrysler Aircraft Division at Elmore, Ohio, has been making an average of more than 12,000 spot welds a day with aluminum alloys. The equipment was designed principally by Mr. H. J. Baker of the Aluminum Company of America (See *AVIATION*, August, 1934), in collaboration with engineers from Chrysler, Chrysler, General Electric and Federal Machine and Welder Company, and was built by the latter company at their plant at Warren, Ohio. It was installed the latter part of September, 1933, and was immediately put on production work with two shifts a day. The welding machine has a thrust depth of 38 in. and produces a maximum welding current at the electrodes of 36,000 amps. The combined rating of the welding transformers is 200 kw., but it has a peak rating of over 600 kw. The timing method is a Westinghouse electronic type known as the Ignitron which has no condenser or other mechanically moving parts in the actual timing circuit. Control from 1 cycle (60 cycles a.s.) to 10 cycles is available. Working current is controlled by means of an auto-transformer provided with 40 tap changes. Electrode pressure is supplied and controlled by air pressure. An automatic safety mechanism for pressure at a constant pre-set value. The machine is operated by a foot switch which through a system of relays in the General Electric sequence panel, operates a solenoid air valve. This valve in turn admits air

to the cylinder and brings the electrodes together. When the maximum desired pressure is reached, a pressure-operated switch from the large, normally closed solenoid releases the welding current to pass. When the tubes spot, fused material out of relays releases the pressure and opens up the electrodes ready to start again. The whole sequence starts functioning like one-half second, also doing the adjustment of the apparatus.

Heat-treated aluminum alloys up to 1/4 in. thick can be welded with the same unit at a 30 in. gap, and, with a 20 in. gap or with the normal air in use, the machine will handle 1/16 in. material.

Production Problems

With accurate equipment available, as described above, the first major problem in producing satisfactory welds in production was taken care of. The provided materials control of those of the variables involved, welding current, time, and pressure. This accuracy is important, as work turned out on equipment previously in use proved to be erratic and made parts which looked good externally, but which failed catastrophically when tested to be in regular in shape and size. A comparison of specimens made on the two machines is shown in an accompanying picture.

The second major problem was to develop good operators. No matter how good the equipment, a poor operator can make satisfactory production weld-

ing impossible. The most valuable asset for a prospective operator is a willingness to follow instructions. Previous experience with spot welding at work is more likely to be a handicap than a help. Of six men who have been trained by the author at Chrysler, Chrysler and Studebaker, the four who made good had no previous experience with spot welding of any kind.

The first step in training a new man is to demonstrate to him the difference between a good spot and a bad one, and to explain where confidence comes from. Once he is acquainted with the basic principles, he is allowed to try a few samples and see for himself how they work out in practice. He is then put to work as a helper with an experienced operator and gradually allowed to take over production work—starting of course, with small, simple pieces. When he is ready to be released full time, an production work, he should be reassured that quality is his most important thing next. Speed is something which will develop naturally as a matter of practice. Close supervision is desirable for some time to make certain that he is handling all types of work properly. Even with experienced operators, the author finds it necessary to make corrections in technique from time to time, although hardly it is more because of changes in machinery to make development than for any other reason.

To estimate "work practice" when any new work is done, it is advisable to provide each operator with a rubber

strip and require that each man stamp his work immediately after welding.

Surface Conditions

Deals with good equipment and well trained operators. Difficulty was experienced with certain parts which had been heat treated in a salt bath, or had been made on the drop hammer. Up to that time only the external surfaces were being cleaned before welding, in accordance with the best information then available. In some instances operators, however, had surface treatments were so variable that no two parts could be welded with the same set up and get anything like the same results, except on test parts. From data obtained from the Boeing Company and Wright Field (Report M-96-1957), it was known that cleaning all four surfaces gave more uniform results. A few experiments proved further that regardless of the type of heat treat, all surface treatments combined could be reduced to a constant if all four sur-

faces were thoroughly cleaned by wire brushing. Thereafter everything was cleaned, whether it was "an received" Alclad or heat treated in a nitrate salt bath. This proved to be the turning point in it. Some parts which had practically been given up as impossible to drop spot weld are now being done satisfactorily. The extra cost resulting from cleaning is more than offset by the saving due to the greater variety of parts that can be welded and the fact that more spots can be made without cleaning the tips.

Wire Brushing

Cleaning is done with a small rotary wire brush driven by a small air drill. (See encl.) The brush is 2½ in. in diameter and is still enough to remove the high resistant film but does not remove the pure aluminum coating on Alclad. In the welds illustrated, the pure aluminum liners are still intact although these specimens were cleaned in the three cleaners. A few jobs can be done

with less easy duty or with Alclad, or equivalent, but the welding tips will need more frequent during with the wire brushing method.

At Chester Woods, it is the practice to leave the foreign surfaces cleaned by the men who assemble the parts. The external surfaces are done by the operator's helper just prior to welding. The operator is held responsible for all surfaces being properly cleaned, as he is the last man to see the work before it is welded. He is, therefore, motivated to refuse to weld any parts which he believes are not properly prepared. This is understood by the rest of the shop. After a few parts were refused on this basis and the rest of the shop knew what was expected, this routine worked smoothly.

While on the subject of surface conditions, it is worth mentioning that there is a pronounced difference in the number of spots that can be made without cleaning the tips when Alclad is used instead of temp-Alclad stock.

The ratio is approximately one to one. Furthermore, Alclad can be satisfactorily welded a number of days after cleaning, while temp-Alclad, once Alclad alloy tips dark rapidly, requiring a second cleaning or else a still further reduction in the number of spots without cleaning the tips. It has also been found that more time and effort are required to properly clean the temp-Alclad alloys.

The first consideration in designing special electrodes is to provide good electrical conductivity. Alclad is an important, however, in welding. Selection of the welding tips under pressure cannot be tolerated except on one occasion, that they defect equally.

Like equal deflection causes slumping of the tips and makes a bad appearing spot. The best commercially available tip material seems to be Elinorm, which has no electrical conductivity of about 15 percent of copper and has the physical properties of mild steel. The chief drawback is the fact that it cannot be heated or oxidized without destroying its desirable properties. Consequently, special electrodes must be short enough to make tips should not be made with longer section above, or a switch sudden change in section, in such conditions tend to make the tip "hot" and will cause surface burning of the spot. Of course, water cooling is essential with aluminum welding as the welding current is high. In fact, preliminary work, repeating high temperature and long lasting very heat up the main axis of the welding machine. Care must be taken to keep all heated or damaged electrical connections clean in order to keep heating to a minimum.

With the system now in operation, it has been found that a slightly rounded tip is perfectly satisfactory and in the three "standard" shapes for the operator in addition to allowing longer life from the tips and a higher rate of production. It is important that the spot be cleaned when the spot begins to show sparks or small brownish spots instead of being smooth and clean. It has been found that in the shaker pans, however, that it is impossible to eliminate small splashes when the heat is high enough to produce the proper strength. These splashes are a surface condition and will come even when the bubble is well below the surface.

The thicker gauge in the best treated alloys prevent smaller differences compared to the thin gauges. Test parts pulled apart in the secondary stresses will not usually pull in better, but on the contrary, will break the bubble in two, showing the crystalline internal structure. This condition begins at about 200 lb. in thickness. The fact that a bubble is not pulled does not necessarily indicate a poor weld. The test alloy will continue to pull better even in the better gauge.

Normally, in production, about 100 spots can be made without cleaning the tips and longer in the major 250. This tip is a standard shape by the chambers of the weld and usually by weld sequence; the shorter the work



Worker who cleans and air drill used for cleaning welding contacts.

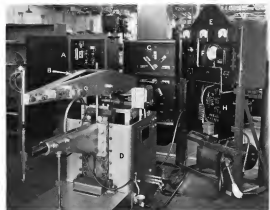
and the lower the current the longer the tip life.

Cost-Spot Welding in Electric

The chief advantage of spot welding is low cost compared to riveting. Rivet cost is difficult to determine, as the work is not all done at one plant by one group of men. Different kinds of rivets are required for different places. Drill riveting is not considered as much for drilling both holes and so much for drilling over holes. The same is true for the use of electric drills. Some rivets are headed up by hand, some with guns, some with hand apparatus, some with power apparatus and some with Thompson machines. The best available figures, however, indicate a minimum average cost of 3 to 4 cents per rivet.

On the other hand, spot welding cost is easily calculated. This labor can be figured directly as the time put in by the operator, plus that of the helper, plus that required to clean flying material, which usually approximates the helper's time. Electrical energy is directly proportional to the product of weld voltage and ampere and time plus a normal daily variation in electrical cost. Tool cost is negligible and easy to compute. A magnetic counter records the number of spots per day. Thus all elements are easily accounted for. In terms of percentage of the total they are: Labor, 85 per cent; electrical energy, 7 per cent; tools, 8 per cent. With everything but first cost and depreciation included, spot welding costs less than 2/10 of a cent per spot based on 6,000 spots per employee shift. Thus, it may be assumed that there is a saving of some 8 cents per spot, or, if spot welds are spaced closer, then events are less than 1 cent per spot.

On a job with the author well above 100,000 the difference of making and welding of improved aluminum alloys in a production line [12].



Welding equipment showing A—Welding power source; B—Single control box; C—Double-line/crosser primary tap switch; D—Electric welder; E—Shifting contact; photo-electric eye and the indicator; F—Electric pressure gauge; G—Main line shut off switch and indicator in room and over the upper area; H—Spot-welding tips.

Welding Technique

No attempt is made here to present curves showing weld current, time of current flow and electrode pressure with relation to thickness of material. It has been found that the best practice is for, in a second attempt in a network. There are no more variables involved than including or plotting of curves to cover all possible combinations in too involved and too confusing for the average operator. In addition to the above mentioned variables, are added almost every combination of different electrode materials, different alloys and materials, heat treated material and smooth metal surface requirements, all requiring different set-ups. The author has found, however, that the only variable which is critical for all these conditions is the amperage. At present, the time of current flow is kept constant for all work. The pressure and amperage settings are adjusted in and the conditions.

In the earlier stages the author had confirmed to previous information that the best tip shape was a 7/16 in. cone and that this shape had to be carefully



Micrographs of spot welds made in an Alclad 17 1/2 in. thick. The electrode was made on the original experimental machine. It was made in a standard shape described in this article.

One Man AIRLINE

By Rodney H. Jackson

Vice-President and General Manager,
Hampton Air Service

With feeder line development the next important job for fixed base operators to do, it should interest them to know how one man gets \$1500 per month gross out of a Simson Reliant during the summer season



THIS never would have happened if Manhattan's Long Beach had not been a base of action and exposed the birds and flowers in the garden of the Southampton (L.I.) winter. But he did, and accordingly he set about to find some way of traveling back and forth between his New York office and his summer home in Long Beach, and without leaving most of his business day in the process. Then he met the author, and in 1951 there began a series of studies of the problem which led to the formation of a one-man airline competing with the "Carnegie" taxi-cab company's taxi connecting New York and Southampton.

The result of the first year's operation was so successful that service was continued and expanded this summer, with the hope of making it a success as well as an operating success.

Five warnings to each the five-phase flight operation: Simson leaves the country at 8 and lands at Long Beach, Long Beach airport in New York at 8:45. Taxi-cab meets the plane for the locomotive run to Queensborough Plaza, where a 5-cent taxi carries passengers to any point in the city served by the first subway system. Our last and third market from home desktop to city desk in upper New York, and about ten minutes longer for the Wall Street district, is a taxi taking of an hour and a quarter on each trip one-way with the Simson. In the meantime, passengers leave the Plaza by taxi at 9:47, the plane takes off at 9:50,

with a 25-minute schedule enroute to Hampton Airport, leaving the taxi which left the city at 9:55. Hampton Air Service, Inc., whose office is in Long Beach, is a gross revenue of over \$1,500 a month during the summer, an example of what a one-man airline can do while doing the job of a one-person and general manager, and in each division has some managing the local Hampton Airport, which is operated directly by the company, and conducting the airline.

The paper is limited to the pilot manager, a licensed mechanic and two or three helpers, who take care of maintenance and do work for the many points outside who visit or leave at the field, and a servicing-invoice, while also dividing the time between the airline and other main general airport duties. Passenger looking is handled through hotels and real estate offices in Southampton, on a 10 per cent commission basis, and through Air Line continental ticket office and Mr. Moor's business office in New York. This arrangement seems a good part of the traffic involved of other roads and interests with which a larger airline must be handled.

Long Hours

The general manager must get up early in the morning to perform the varied duties of the many employees of a more professional organization. First he makes a 6:15 a.m. weather forecast radio, radio reports, from WWT at 12:30, 1:30, 2:30, and from local conditions; he acts as plane dispatcher, being his decisions on his own forecast, he supervises maintenance and is responsible for seeing that the mechanics and helps keep the airplane schedule and in perfect operating condition, he directs traffic, makes decisions, spending every day in New York from 9:00 to 5:00 handling correspondence, at

the telephone, or making personal visits to adjust business, and he plans the airplane. In the evening he becomes the director and goes over the necessary reports and other paper work with the secretary, checking the income, and closing over the day's cash receipts.

Most airplane and pilot not available for charter flights out of New York City during the day, and from Hampton Airport in the early morning, late afternoon, night, and on weekends, so far as they can be arranged without interrupting the daily schedule. About 20 hours of each day is interrupted for the 1958 season at 20 cents per mile, which equals about \$25 per hour. This is an important addition, both to income and to building up total airplane time in order to cut the fixed hourly costs.

During the "downward" period from the first of June to the end of September last year, Hampton Air Service only flew 114 flights completed out of 167 scheduled (performance average 68.62 per cent) and a total of 227 passengers served. The 114 flights of flying at schedule were completed by 144 hours of charter, solo, and personal trips by Mr. Moor so that the cost per airplane-hour was reduced to the negligible amount of \$10. The slightly larger, 25 mph. faster, and more expensive Simson now being operated is costing about \$25 per round trip in New York of one hour and fifteen minutes, so that a 50 per cent increase in passenger revenue over last year will provide free daily air transportation to the locker of the driver and will actually return a net profit for the season. With only a small four-passenger airplane it would still not be possible to make a profit on an annual basis, however, for weather's frequent private use of the airplane the weight of fixed charges during night periods of inactivity would have to be covered by a profit during busy periods.

Rates for the 50-mile flight have been established at \$2 one way (a reduction of \$1 from last year, \$12 round trip with a 30-day limit, and \$5 per trip up to a twenty-two day limit which sells for \$100). The latter equals \$1.60 cost per mile. Although some of these flights were sold last year, several of last summer's occasional passengers have returned to purchase them for the present season. The ticket, which is purchased when presented at the airport, may be used by any member of the family or his guest, with the simple provision that no rule be used. When a second full load can be loaded, especially on Friday afternoons when everybody seems in such a hurry to leave the hot city, an extra schedule at 4 o'clock is run with the Simson, or an outside plane may be chartered for a second service at 5:30. Four one-way tickets cover the cost of dispatching the extra back to New York, while other passengers are carried, bringing in only \$20, the less is charged up to creating good will and building up the business.

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When the fog rolls in

The principal operating difficulty lies in a local weather condition possible in the south shore of Long Island, making weather forecasting a real difficulty and 100 per cent regulatory a practical

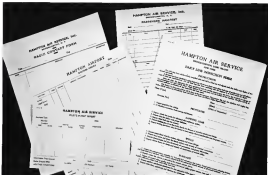
possibility. Morning and late afternoon fog covered, usually for thick, rolls in from the ocean about once in June and early July, and with a simple-minded ignorant no flights are attempted without an actual 500-ft ceiling. The terrain along the seacoast is fairly level with two large intermediate airports, but generally when ceilings are under 1,000 ft an alternate route is flown, following the outer beach along Great Neck Bay, preferably a maximum emergency landing strip.

Use one way route

Two-way routes is carried, although there is no round service at Hampton Airport. The airplane maintenance is used to give possible positive reports which are pulled up by the airport all-weather room, as well as to report special weather reports from Newark when necessary. The additional safety which rules given in doubtful weather is realized and appreciated by the passengers. When a situation or alternative is not indicated, probable or even possible, suddenly to complete a scheduled trip, passengers are advised of the fact by telephone by the pilot long enough in advance to take time and still reach their destination in time for previous appointments. On only one occasion

during the 1958 season was a trip cancelled without ground being given.

In addition to personal calls on trip guests in their homes and offices, a real advertising campaign has been directed at the 100 or still smaller summer cottages in the Hamptons, choosing the point that it is actually less expensive to commute daily by air at \$40 per week than it is to maintain a home some apartment as the day throughout the season, going down to visit the family only on weekends. If this campaign produces sufficient support, Hampton Air Service will operate a two or two-day passenger multi-stationed airplane during the 1959 season. A large number of airplanes in the city-owned landing at the foot of Wall Street would also give many obvious advantages over the present service. But it may be seen that such an expensive service, for only low summer months, could be safely started only after several season before the daily and emergency had been learned. In the meantime a one-man airline is actually running back and forth, getting operating experience over the route and looking operating problems with a degree of regulatory and safety that is building up public confidence so the point where a much enlarged service may be supported.



Line important from about mid-July to September. There must be three cables in flight. Flight Service, spaced by weather, must be in place. If it is in place and again to other related members of staff. Weather must be in place before each flight and checked by weather station (indicated) at airport. Early morning weather observations are made by weather station from land, and after the Wall Street from air. Weather reports and messages received and transmitted in scheduled flight.

Editorials

INVENTION & ENTERTAINMENT
TABLETS IN NUMBER 2

WITHOUT ARMOR

"We as aviation carry a heavy responsibility. . . . We are no longer present our families with an army. . . . Every circumstance which we take must be laid open to bombardment."

Then Charles Lindbergh, in the role of a machine lather, sat in the door of official Germany a warning that the whole world would do well to heed. Simply and eloquently, he put his plain language facts at which diplomats and military brass hats have haggled for the last ten years. His speech in Germany will go down as one of the high spots of a distinguished career. It may well prove to be a turning point in the history of international relations.

The facts are not new. Those of us who have watched the evolution of the airplane over the last twenty years have long been aware that it is the most potentially dangerous weapon that has ever come to hand. As a defensive tool it is without equal. Unfortunately, it is, at the same time, an effective one of the first order. Here in America, where the dangers in the nearest possible enemy are very great, it has been reliably way to keep the two functions separated. Obviously, however, the situation is entirely different, for dangers from capital in capital are well within the flying range of machines of even moderate performance. There, a destruction of facilities would be followed immediately by an army of long-range bombardment of civil populations that staggers the imagination.

High then, then, that someone cried "Hold!" before the nation of Europe go too far down the road that can lead only to mutual destruction. Lesser prophets have long since been crying in the streets, but their voices have been lost in the din of slaughterhouse battles far away. Now, however, comes one who speaks with authority—and whose people in Berlin, London, Paris and Rome had been doing so peacefully and happily some of the intelligence which the United has extended there, but some fear meaning they wishes to find that the hour they have had by the tail has slipped from their grasp and has turned to destiny theirs.

MEN WANTED

FOR the last five years our list have been full of letters from people looking for jobs in aviation. Now, almost overnight, the situation has been reversed. Our list are filling up with letters from the industry asking for men—many more.

As we see it, this situation is neither temporary nor to be taken lightly. Considering the probable expansion in all branches of the industry in the next five years the need for new personnel is going to be increasingly acute. If standards were not so high the aviation would not be so serious, but aviation needs not only superior

but quality, and the supply of really good men with adequate training is limited.

Fortunately there are a number of excellent civilian aviation schools in the country which are well staffed and well equipped to turn out trained men. It is essential, however, that they be given exact qualification regarding the kind of men the industry really needs. Manufacturers and operators alike will find that cooperation with the school people will ease their future personnel problems. Unless they are willing to inaugurate their own training departments, an expensive procedure at best, it is the only way they can be assured of getting the kind of men they need where they want them.

A TIP FROM THE RAILROADS

FOR YEARS it has been common practice for railroads to finance the purchase of rolling stock by leasing trust certificates. Something like a billion dollars worth of certificates are now outstanding securing freight and passenger equipment. So far, aviation interests in the United States have been able to finance their purchases of flying equipment without resorting to public borrowing. Now, however, with expansion and equipment programs under way, and with such resources cut in the home during the post-revolutionary period, resources have been seriously depleted and seeking capital is scarce. Recently one of the major issues has taken a tip from the railroads and is planning a re-equipment program financed by the issuance of trust certificates.

There is no innovation that should be watched with interest. It may offer a possible way for more than one line to get through a modernization program at a time when resources are generally below expenses. We hope, however, that the period for such a necessity may be short. We sincerely hope that the nation will never be afflicted with the burden of long-term debt that is the ever-present nightmare of railway operators.

Flying Equipment

What's new in aircraft, engines and major accessories

Ryan's New ST Series

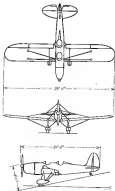
Three ships are offered with Menasco power plants of 95, 125 and 150 hp.

After the crash of the mid-engine ATA passenger working (see feature), we dropped down to San Diego and spent the best part of a day with Claude Ryan and Bert Friedman at their Lindbergh Field base. The Ryan Armament Company shops were busy turning out 1500 versions of the Model ST two-seater. Already they have produced as many ships this year as they did in the entire year of 1937.

High spot of the visit was a chance to fly the new ST. We went out with John Fommers, Ryan's chief test pilot. We followed him through for a take-off and a landing, and then tried a couple exercises which turned out not too badly, considering that we have done comparatively little active flying of late. The ship is a joy to fly. She is light and quick on the controls, but stable enough so that it does not have to be flown constantly even in fairly gusty weather. She made good turns, "cut off" and would fly comfortably "hands off" for extended periods. Fore and aft trim by means of the elevator tab was found to be very effective.

Lateral control as well was unusually good. Sticked, power off or power on, the ship responded quickly to lateral stick movements, and showed no tendency to slip off into a spin, right or left. Spin qualities appear to be good regardless of position of the flap. Recovery is quick. As flap is lowered time for recovery decreases.

In landing, with the flap full down, we found no evidence of tail buffeting or blanketing, the ship being under generous longitudinal control at all times. The flap makes possible a steep approach glide. The actual landing speed appeared to be reasonably low, and the ground run, with full brake application was very short.



Ryan ST Series for 1938, similar in general appearance to their predecessor, illustrates a number of improvements.

Better than 99%

EXACO
CASOLINE

Delta is convinced that Texaco Products keep engines cleaner, lengthen the time between oil changes, and contribute substantially to low operating cost.

TEXACO
Aviation Products



Delta is proving the dependability of these products

Future Simon DeLuxe Low-Wing Transport, and Lockheed All-metal Electra, Delta's latest available report shows their engines are operating more than 99% on Avia. This is a tribute to Delta operating skill . . . and a tribute, too, for Texaco Aviation Products. Delta has used Texaco exclusively ever since engaging in the passenger transport business.

Thousands of flights have proved to Delta the dependability of Texaco Aviation Gasoline . . . that it is fast starting, quick accelerating, non-detouring . . . powerful.

Delta has proved that Texaco Airplane Oil maintains pressures at high temperatures—resists wear—and saves lives from shrapnel and carbon forming elements.

You, too, can get the same dependable operation with Texaco Products because they were refined especially for aviation use.

A Texaco representative will be glad to provide practical engineering service to prove the economies of Texaco Products.

THE TEXAS COMPANY
235 East 42nd St., New York City

Major cities distribution facilities assure prompt delivery

Piston are cross-ribbed on the under side of the head to increase their strength and their skirts are slightly longer than those of previous Cyclone models, to increase bearing surface and reducing the tendency to "rock" in the cylinder.

The connecting rod system is conventional. Eccentricity introduced in the design of the master rod to equalize stresses has resulted in a stiffer and lighter pin has been increased in size and thickness and the pin in the master rod flange is provided for



Supercharger impeller and diffuser plate for G series

proved sealing surfaces for the pin have been obtained by providing a flat run flange on the impeller pin holes. The crank pin hole in the master rod is also provided to provide a more nearly perfect bearing surface between the rod and the rod shaft at the high load house crankpin bearing. Both the crank and wrist pin bearings of the articulated rod and the piston pin bearings of the master rod are milled longer upon into gasification. This increases against the strength of the rod and of the rod by dissolving metal holes.

Keeping minor modifications in the detailed dimensions, the reliability of the Cyclone G is evident as that of the P series. An important feature of the reliability is the introduction of the dresser dropper first introduced in the P-50 Cyclone series. (See details on Aviation, June 1957.)

Detailed modification to increase strength and withstand higher stresses are the principal different between the construction of the G and P series Cyclones. Replacing the main section of the main of the G series are driven for direct drive and ground models. The main section carries off-center foundation is a two-piece part, milled by one through hole. Main crankshaft bearings and cam drive gear assembly are carried in this section. The new section contains the cam mechanism valve gears and pusher, crankshaft and valve bearings and fuel injection in ground engines. Oil passages are drilled in this section for valve gear

lubrication. The new section also carries the governor for the constant speed propeller. Immediately behind the main section is the mounting section having two equally spaced legs—mainly with the new. This section forms the front end of the supercharger diffuser distribution chamber and carries the tapered pins for the induction pipe leading to the cylinders. In the governor section are carried two diffuser and supercharger runs as well as carburetor, mounting pins for carburetor and fuel pump, cam mechanism and the Cam of the filter. It acts also as a bearing for the accessory drive gears whose bearings are carried in the governor section. An approximately flat plate of magnesium alloy, the accessory section forms the rear crankcase cover. Accessory drive parts, mounted on the forward side of this section, are enclosed in the rear part of the supercharger intake, which is separated from the diffuser chamber by integral wall.

The G Cyclone supercharger is generally similar to that of the P series. Displacement increases in inlet and diffuser main dimensions and passages and maximum revolutions in minutes have been made. Six optional engine speed ratios are available, ranging from 550 to 3000 rpm. (See details on Aviation, June 1957.)

A four-cylinder crankshaft of material increased capacity has been designed for the new engine and improved master control has resulted in a fine adjustment of fuel air ratio then previously possible. This is accom-

plished by increasing the effective travel of the mixture control lever. The mixture control has been added a device which can fill fuel supply at the carburetor for mixture. The use of a short side to lead the off from the center of the mixture chamber to the meter and leading inverts the chamber into a venturi which removes foreign particles too small to be separated by oil drains.

The piston ring type of oil seal has been added to the supercharger drive shaft, propeller thrust nut, propeller shaft oil transfer for the turbine crankshaft propeller, and the cam drive gear oil transfer. Special oil sealing bearings on the accessory shaft eliminate leakage into accessories.

Two Standard Magnetics and the engine oil pump with light vacuum pump drive are furnished as standard accessory equipment. Mounting pads and drives are provided for constant speed propeller governor, two gear synchronizers, starter, generator, fuel transfer shaft, fuel pump, angle drive for vacuum pump and propeller, or pump. Accessory gears are driven through a single extension shaft applied to the rear end of the crankshaft and gear gears are used externally. The extension shaft is coupled to main accessory drive gear through a special spring coupling to cushion the accessories from acceleration loads.

The main oil supply lubricates all parts of the engine including the valve gear. Full pressure lubrication is provided in all oil main bearings by gear pump. An adjustable relief valve

selectively maintains sufficient oil pressure and bypasses excess oil to the oil line. Oil from all parts of the engine drains into a sump between the housing cylinders. The use of a short side to lead the off from the center of the housing shoulder in the master and leading inverts the chamber into a venturi which removes foreign particles too small to be separated by oil drains.

The piston ring type of oil seal has been added to the supercharger drive shaft, propeller thrust nut, propeller shaft oil transfer for the turbine crankshaft propeller, and the cam drive gear oil transfer. Special oil sealing bearings on the accessory shaft eliminate leakage into accessories.

W.E. Type 20

Western Electric adds another receiver to its aircraft line

RECEIVERS have recently added to the Western Electric's new lighted three-piece receiver, the Western Electric Type 20. This unit is a superheterodyne with two stages of tuned radio frequency, two stages of intermediate frequency amplification and two stages of audio frequency amplification. Four separate frequency bands are provided (200 to 400 kc, for known and weather reception; 250 to 300 kc, for commercial broadcast; 1,600 to 4,000 kc, for aircraft, police and amateur work; and 4,000 to 10,000 kc, for aircraft, amateur and foreign broadcast).

Characteristic shape and location have been changed to provide a new type of antenna in improved performance. The antenna opening on the top of the side of the housing has been circularly shaped and located to provide maximum air flow over the cylinders through the vane-shaped opening at the rear. Streamlined into the bottom of the housing is an air inlet.

To provide cooling air for all sections a high rate of air in the direction is used in the design of the antenna.

W.E. Type 20 Receiver

The output is 700 milliwatts. The set is designed so that the crystalized receiver in either or both of the high frequency bands may be employed, and for this purpose a frequency crystal, controlled unit is available for measurement. Convenient facilities are offered for switching from one frequency band to another. The set is available in direct or for remote control.

A fence known as the "Vulcan" robot helps atomic masses when re-

ceiving weak signals. Automatic volume control is normally used except for beacon reception where it might interfere with the performance of the receiver for course indication.

Indicating vacuum tube, the receiver weighs 14 lb, measures 9 in high, 3 1/2 in wide, 4 1/2 in deep. It is furnished on special shock absorbing rubber mounting.

Ranger "24"

Improved performance in new Fairchild cabin monoplane

COMPARATIVE Fairchild-built pumping, movement, brakes, and tires, the Ranger power "24" is now being produced at the rate of four per week. Wings, fuselage, tail and landing gear are finished with those of the latest Warner "28" and a number of detailed refinements over the previous Ranger model are incorporated.

Cowling has been reshaped for better streamlining, exchange in a clean and broader nose. The sides of the fuselage are easily removed exposing engine, oil tank, and battery box. The engine mount is integral and located under the intake duct. The engine light is supported on four rubber pads built into the front and designed to take the engine weight in fact. Engine motion is taken by an entirely different type of rubber linkage at the rear and forward of the wings.

Characteristic shape and location have been changed to provide a new type of antenna in improved performance. The antenna opening on the top of the side of the housing has been circularly shaped and located to provide maximum air flow over the cylinders through the vane-shaped opening at the rear. Streamlined into the bottom of the housing is an air inlet.

To provide cooling air for all sections a high rate of air in the direction is used in the design of the antenna.

gave cylinders. Most of the engine parts are identical with those used in the twelve-cylinder military models which develop 16 hp per sq in. greater power. This improved reliability has been obtained at a negligible increase in engine weight.

PERFORMANCE

NEW 24-100 HORSEPOWER "24"

Weight empty	1,500 lb.
Weight fully loaded	2,000 lb.
Maximum speed	110 mph
Cruise speed	100 mph
Service ceiling	10,000 ft
Rate of climb	1,000 ft per min
Range	1,000 miles

Seaplane ATCS

Stinson Rebuilt and Taylor Cab licensed on Eds float

Two SR-7 and SR-8 series Stinson Rebuilt are now available on Model 400 Eds float with water rudders at standard equipment. These ships are fixed



For the first time the Taylor Cab has been mounted on a seaplane at Eds float. This modification is standard on SR-7.

with select Lycoming or Wright engines. Full load, gross weight total can be made in less than 30 seconds. Cruising speeds are better than 120 mph. A standard have been delivered recently to owners in the United States, Canada, and Mexico.

For the first time Stinson has been used for a Taylor Cab in a seaplane. The 1936 Model 32 Cab has been



The New Fairchild Ranger "24"



Four-cylinder and crankshaft assemblies of the G series



WESTON Model 415
Air Temperature Indicator



WESTON Model 416
Technician Indicator



WESTON Model 416
Aviator Indicator



WESTON Model 402
Cyclone Temperature Indicator



WESTON Model 416
Carburetor Air Temperature Indicator



WESTON Model 431
Time Landing Indicator



WESTON Model 417
Radio Compass Indicator



WESTON Model 416
Oil Temperature Indicator



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Millions of safe transport miles have cemented industry's faith in measurements provided by the electrical direction of a pioneer... a principle perfected by WESTON half a century ago... and last applied to aviation needs by WESTON as this. Today, the WESTON line includes instruments specifically designed to meet aircraft needs... instruments which add necessarily to safety and add to keeping operating costs low. Complete data on WESTON aircraft instruments are available in booklet form... WESTON Electrical Instrument Corporation, 518 Westinghouse Avenue, Newark, New Jersey.



Weston Model 416 1000 cc. Air Temp. ready for delivery in a Canadian version

ground on ATC on Edo Model 1000 boats. The heaviest gross weight is 1,000 lbs. which, with an empty weight of 602 lbs., leaves 418 lbs. for useful load. This is divided up among pilot and passenger, full tanks of gas and oil, and 14 lbs. of baggage. After flight testing by Mr. Walter Janssens, chief engineer of the Taylor Aviation Co., the first ship was delivered to the west coast for Mr. W. S. McVie of Westminster, Calif. Test results indicate that take-off from smooth water requires less than 30 seconds and that the speed is 18 mph and the general handling characteristics are considered from those of the Cub in a first place.

Porterfield Zephyr

New tandem monoplane set sail for \$1295

Forever why in the Porterfield line is the new Zephyr has proved two water which recently has been lost flows at Kansas City airport. The Zephyr has a Continental 40 hp engine and sits for \$1295. Fuel consumption is about 2 gals. per hour and refueling tankage is provided for 44 hr. of flying at a cruising speed of 25 mph.

The Zephyr is a two place tandem monoplane of conventional construction with dual controls for training purposes. It was designed by J. W. Porter of the University of Minnesota Engineering School.

"Boost" Regulator

Wright and Eclipse cooperate in new supercharger control

Over a while ago pilot and copilot ran out of breath and lost control to operate all the engine controls in the well-belt of constant stress, particularly at take-off. So Wright and Eclipse got together and developed an



Supercharger installed in Cyclone engine

automatic, two-position supercharger "boost" regulator for Cyclone engines to supplement the old manually operated throttle stop system.

In the new design, maximum boost is maintained at take-off but, at cruising speed, it is limited to reduce power by its engine oil controlled servo piston controlled through two systems by intake manifold pressure. The servo piston moves the throttle without any movement of the pilot's throttle control and the change-over is effected by the simple movement of a selector lever in the cockpit.

The regulator may be adjusted through a tension spring on one of the pistons, to maintain pressure between 28 and 40 in. of mercury, absolute. Values for "Take-off" and "Cruise" positions for a particular engine should be determined at take-off. The regulator looks like



At take-off the selector lever is set in "take-off" position and the servo piston moves the throttle to the "take-off" position. As the engine speed increases, the manifold pressure at that altitude in the piston is reduced to the "cruise" position. The servo piston moves the throttle to the "cruise" position. The servo piston moves the throttle to the "cruise" position. The servo piston moves the throttle to the "cruise" position.

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Westinghouse Transmitter

Lightweight voice equipment for private owner aircraft

As a companion piece for the Type 68 receiver recently announced about a year ago, Westinghouse Electric & Mfg. Co. (Chicago, Ill., U.S.A.) has announced the Type 68 transmitter unit. This unit is rated at 15 watts when operating from a 52 volt battery, but will deliver 30 watts to the antenna with a fully charged battery and with the charging generator running. Its normal operating current is 13.5 amperes at 52 volts D.C. weight, complete with remote control and coil trailing wire antenna, 27 lbs. Two frequencies, both crystal controlled are available, 3,500 kilocycles and 3,100 kilocycles. Change-over is accomplished by a frequency selector switch located in the remote control panel.

and the indicator again reads normally. The bearing indicator line remains constant, and turns to right or left equally with the rotation of the plane.

Telegraphic code and signals such as A and N because signals are readable on the indicator at speeds up to 25 words per minute, and cause no angular deviation of the line of bearing.

Two-Way Learadio

New units combine for lightweight 2-way communication.

Monroe was made last month (Aeronautics, July, 1935, p. 43) of the new type 2-2 Lear-O-Phone transmitter (Lear Development, Inc., 128 W. 17th St., New York, N. Y.) recently announced. Used has since come in as a new Lear receiver which, with the Lear-O-Phone, gives a complete two-way communication system for aircraft which weighs only 33 lb. complete.

The type 2-2 receiver is a compact unit (overall size, 5 in. x 7 1/2 in. x 4 in. deep) covering three frequency bands (250 to 400 kc.; 530 to 1590 kc.; 2580 to 6200 kc.) under control of a single selector switch. It is designed principally for direct operation, but master control unit can be furnished when required. Control is of the superheterodyne type. The set will operate either from storage battery or from dry cells. It incorporates an automatic noise filter to reduce headspace noise to



The Lockheed Twin Monocoach, Model 12

a minimum. The set itself weighs 7 lb. and the power unit another 7 lb.

Twin Monocoach

Light biplane introduced by Lockheed Aircraft Corporation

Since the transport lines on the style of twin-engine biplane monocoach equipment, there has been much thought among designers of substituting the power plant in another shape. Already it has been done in tractor line equipment having capacity for eight passengers. But Lockheed went a step lower in the weight range and the result is a four-seat plane with two 90 hp Lambert engines housed in the Twin Monocoach.

The first of these ships has been flown through Kansas, Oklahoma, Texas, Hawaii and Vietnam in a demonstration tour by Cliff W. Bruch, president and general manager of Lockheed. During the first week, 1,600 miles were covered in 12 hours, 35 minutes. Cruising usually at 130 mph the ship has a range of about 900 miles at the full fuel capacity of 79 gal. of gasoline when operating in a four-place ship. When used as a five-place ship the fuel capacity is reduced to 40 gal. and the range is about about 500 miles. A 250 lb. baggage allowance is provided in either case.

Transport features such as retractable landing gear, and light type fuselage wing flaps are found in the Twin Monocoach. Structurally the ship is conventional. Specifications are: span 26 ft., length 24 ft., 6 in., gross weight, 3,220 lb.; cruising speed, 130 mph.; landing speed, 40 mph.



Lockheed 12

Designer on transcontinental test flight

Flying as a passenger is a two-engine biplane test flight in Hall F. Field, Lockheed's chief engineer in the latest creation—the Lockheed 12. The new ship, powered with two Pratt & Whitney Wasp Jr. 5-B engines (monocoach output, 90 hp.), is one of the answers to the Department of Commerce tender list specifications. It is a smaller version (right place) of the familiar Elmer, having a span of 49 feet 6 in., and a length of 36 ft. 4 in. Top speed is nearly 200 mph. (5,000 ft.); cruising speed, 200 mph. (7,000 ft., 68 per cent power). Maximum fuel capacity is 105 gal. and cruising range, 800 miles. Gross weight is 3,220 lb., and useful load, 2,570 lb.

Before final assembly, the first Lockheed 12 was subjected to a particularly severe series of static tests. The fuselage was hoisted high by means of a derrick and tipped over on its back. It was then placed upside down in a special jig and the wings were attached for the static tests.

When two of steel were loaded in bags on the wings and about five tons on the engine nacelles, to prove the accuracy of the calculations made.



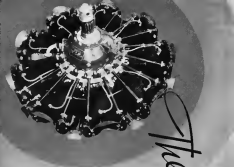
WEIGHT
107 LBS.
per
HORSEPOWER

LOWEST
1000
M.P.H.
FULL CONSUMPTION
1000
M.P.H.
1000
M.P.H.



New "Q" Cylinder

Weight Engine's 1000



The 1000 H.P.
The
G
CYCLONE
NOW AVAILABLE
FOR EXPORT SALE

The new 1000 h.p. Wright Cyclone—the world's most powerful single row radial—extended engine in various forms—has been available for years. It is now available in a new form, the 1000 h.p. Cyclone, which is a new design, with a new cylinder head, giving 1000 square inches of breathing area per cylinder, the highest design, showing increased efficiency, increased reliability of the valve gear—no externally driven valves of the new type of Wright Cyclone engine.

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WRIGHT
AERONAUTICAL CORPORATION
PHILADELPHIA
NEW JERSEY



Lear Vee M.B. Receiver



First actual photo of Lockheed 12



*Kollsman
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Precision.*

WORLD-WIDE ACCEPTANCE

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Buyers' Log Book

What's New in Accessories, Materials, Supplies, and Equipment

Multiple Circuit Connectors

Revere develops new line of connectors for aircraft use

With quick detachable engine installation a part of every modern airplane, means for quickly disconnecting a number of electrical circuits are highly desirable. Revere Multiple Circuit Connectors in several sizes have been especially designed for aircraft and aircraft instrument installation. Back to Air Corps specifications, they consist of a plug and a socket assembly. They are available in sizes with three contacts (over 200 amp. and one 25 amp.) to 14 contacts (12-40 amp. and 2-25 amp.). At present there are seven intermediate sizes between these two extremes. Dimensions are small (the largest assembly is only 2½ in. long, 1½ in. in diameter). Contact pins are arranged in two pins on 18 inches



Revere multiple circuit connector

in one position only. All connectors are shielded for use in conjunction with radio apparatus and are designed to fit standard Revere standard conductors and fittings.

New Aircraft Battery

Preco-Lo-Line Unit of high capacity especially designed for transport service

New aircraft components have "taken it on the chin" as has the storage battery in the last few years. Every new auxiliary part on board has added just a touch to the battery load, and equip-

ments have long since been looking for units of high discharge capacity but with outside dimensions to fit standard battery boxes. To meet this situation, the Preco-Lo-Line Battery Company, Inc., of Indianapolis, Ind., has just placed on the market a new battery whose outside dimensions are within the limits set by older types but which has



Preco-Lo-Line Dryo-Batt 6 storage battery

an electrical rating of 305 amp-hrs. at the 5 hr. rate and 120 amp. at the 20-min. rate (S.A.E.). The net weight of the battery with electrolyte is 51 lbs. The overall dimensions are: length 14½ in., width 7½ in., height 10½ in. Each cell contains 15 plates 7½ in.

Structural features of the new battery are novel. Instead of bringing the cell construction out to the top of the battery, as is usual practice, the electrolyte path through the compartment walls under the battery cover and directly above the plates. Located below the top level the heat at high discharge rate is dissipated through the electrolyte. The most construction is expensive. Modelled now it is a part of maintenance through which the gases resulting from the cells are passed to a common discharge outlet. To each individual in a given type (B-2) with a granular acid neutralizing material which removes the acid from the gases leaving the battery. Acid neutralizing tubes are readily removable, are inexpensive to replace. They need be replaced at relatively long intervals only. A special non-spill vent arrangement is built into each filler cap in each cell. A cleverly designed lead weight with a rubber valve attached down the vent hole and prevents loss of liquid in case the battery is inverted or tipped over onto its side.

The assembly is plain and is enclosed in a simple, and it is easy to keep clean due to the liquid-proof construction. The only exposed lead parts are the two terminals.

Threadlock

Doublet device approved by Department for aircraft use

The Doublet screw locking device (Doublet Threadlock Corp., 120 Broadway, New York) has recently been given Department of Commerce approval for use on licensed aircraft. This special screw thread was designed to provide screw fastenings which would remain tight under all service conditions without lock washers, jam nuts, nut pins or other auxiliary locking devices. It can be fastened in all workable materials by all commercial processes. It can be fastened without loss of locking efficiency, and is available for special conditions in alloy steels and non-ferrous metals with all commonly used platings and compound finishes.

The locking action is illustrated in the accompanying photograph. The locking surfaces are two tapered faces of the nut and thread. Used the nut is rotated, the tapered faces are not in contact in the unfastened position, and do not fit in free running. When rotating occurs, the nut is forced upward and locking is caused by static friction between the tapered surfaces of the bolt and nut. When the nut is turned home,



Locking action of the Doublet thread lock device, additional turning of the nut forces it to place the tapered locking surfaces of the bolt and the nut in contact.

the tapered thread form of the bolt are heavily compressed and those of the nut elastically expanded. Locking is accomplished by simply turning off the nut with a wrench. Doublet thread devices are available in a wide range of sizes and types for commercial and other applications.

Constant Speed Propellers

SPECIFIED

for latest type
Army Pursuit Aircraft
by Seversky



HAMILTON STANDARD PROPELLERS
EAST HARTFORD, CONNECTICUT
DIVISION OF UNITED AIRCRAFT CORPORATION

not equipped for instrument flying are rated all the way under conditions of poor visibility, unless they fly between the horizon layer of the event and the ground. The new regulations apply only to the designated Civil Airways, and do not restrict flights which do not use them.

Pilots intending to make an instrument flight on an airway are required to submit a flight plan in advance. All aircraft must operate at prescribed altitudes: eastward (from 0° up to but not including 180°), at odd thousands of feet, westward (from 180° up to but not including 360°), at even thousands of feet. If an airway is crossed, it must be at 500 ft above the prescribed altitude.

Directly in charge of air traffic control work is Earl F. Ward, who was appointed to the job last March. The system is the outcome of his experimental work for the airlines at Newark, where he was stationed before the Bureau returned him.

"Express Only"

Rising loads may give older equipment new lease on life.

COMMERCIAL AIR EXPRESS, TWA's independent system, clocked up a record of \$9,417.36 for the first six months of this year. This compares with \$11,325.36 for the same period last year—a gain of 26 per cent. Add to this the significance of May's record 74.09 per cent load factor (\$724,531 net miles flown, 7,738,653 net miles accepted), and the line's severe problem becomes one that TWA's Douglas have grown so large.

To meet demands for space, and to

afford a recurrent opportunity to put full use out of equipment made obsolete simply by the introduction of new types, TWA has been experimenting for several weeks with some of its older ships, retired from service when the Douglas came in, for "all express" service. Most favorably considered are the four tri-motored Fokers, which, equipped at all purposes with fuel and loaded to full supply at fairly short hauls, could peak payloads over 4,500 lb. The average express shipment weighs about 5 lb. That would mean, assuming a 60 per cent average load, capacity of about \$1,500 at \$45 per mile, for a trimotored unit as GAI's present rate against an operating cost of about \$1,200. For shorter hauls, (as on the New York-Chicago route) income would amount to \$400 against an operating cost of \$355.

Also under consideration are TWA's five Consolidated Fleetster 20-A's, eight-

engine ships which can carry only 1,500 lbs. payload, but are cheaper to operate than the Fokers—and better. Both types are at present being flown as test runs to determine cost of operation and general suitability.

The biggest difficulty will be to fit planes on the West to East run, as more express than West than come. For other ways to solve this problem the line is negotiating for common from West Coast shippers of perishable goods.

Transatlantic

British and PAA to operate
New York-Bermuda service in fall

ONE more step in the international race for scheduled North Atlantic service was taken July 15 when the British Air Minister, Viscount Swinton, announced that a five-year agreement with Imperial Airways had been made for jointly New York-Bermuda service. It will start sometime in the fall, and will be operated in cooperation with Pan American.

To finance the venture, the British Government has provided an initial subsidy of \$15,000, and a capital grant (to the government of Bermuda) of \$24,500 for purchase of a ship. British contribution for equipment will be one of the Short Empire Flying Boats, now building.

Pan American's share of the service will probably be flown with a slightly larger version of the famous Sikorsky S-42 which blazed the Pacific west. These boats, known as S-42-Bs, are building at Bridgeport now. They will weigh 26 tons gross, mount all the 13 tons of the Pan American Clipper.

Though the Bermuda service will not necessarily be part of the proposed transatlantic line it will provide a good workshop to test Atlantic flying conditions.



BRITISH EMPIRE ROUTES

will be served by 14 of Short's Fleetster 20-A's, the best of which have four and five engines. PAA will use their Fleetster 20-A's as well.



THE ALL-METAL AERONEER I B

is completed, and is taking its flight tests on the West coast. Here the record-holding biplane can be seen in action. It is the product of the Aero Engineering Corp.

ON THE BOTTOM



• Late in the afternoon, we look heavy. Sunlight—streaming down through it—looks much the same at night through water. It reminds you again that rain is a deep or misted—that he writes the horizon—and that only a little shows the bottom of the sea or air.

Blue and all but engines are high pressure machinery—things which could not operate in the air above us or of air—which operate but and less efficiently as we move up from our natural habitat on the bottom.

Supercharging compensates somewhat for the increased pressures of higher altitude—but not entirely. All aviation engines today are capable of producing more power at sea level than at 10,000 feet. All are capable of producing more power when the barometer is at 30 inches when it is at 24.

It is the fact that engine each moment of added power is valuable in aviation—that makes the potential power of high octane fuels vital to the industry today—and tomorrow Ethyl-Gulfair as Corporation, Chrysler Building, New York City

Traffic

Latest available statistics from the Bureau of Air Commerce and the Post Office Department—Domestic airlines only



Balloon Battle

Goodyear entrant wins national meet; Army balloon burns

The 20th Annual National Balloon Race came to a close at Denver, Col., July 5 with disappointing results: one broken back, one razed balloon—no records.

Box 35,000 on it bags were entered. Army, piloted by Capt. Wayne McCormick; five for the Navy, piloted by Lt. E. F. Tyler and Capt. F. H. Glaser; Goodyear Tim and Rubber Company, Frank A. Tootman; Great Lakes Engineering, Mildred Wells; and the Detroit Balloon Club, Ray S. Cunningham.

First landing was in the Detroit river, which, on the afternoon of

rain's onset, was topped as a wind flurry and drenched. The other five got off all right, drifted slowly into the north-east.

The Army entrant didn't remain as very long. After being berthed 30 miles north of Denver for several hours during the night, it began to drift south, then west toward the Rockies. A dog rope was thrown out to round its progress. Then a sudden down draft hurled it into a hillside. McCormick and his aid, Lt. John A. Tamm, were thrown clear just before the bag burst into flames and came crashing down on

the basket. The flight came to an end only 15 miles from Denver.

The Navy balloon went down 30 miles from Denver, but came down so high the basket bounced 30 ft. in the air. Pilot Oliver was thrown out, apparently unharmed. He helped pick up the balloon, then went back to the hospital, to discover he had a broken vertebra.

Only relieved to get out of the State, and the apparent winner of the race, was the Goodyear balloon. It landed at Pueblo, 80,000 miles from Denver. This was far from the 20th annual record, standing since 1927.

Airline Map Expands

Two new far west services organized. New equipment for Hanford. Four and a half days to Buenos Aires

A seasonal speeding that went into effect late July will bring service from Buenos Aires to New York in 4½ days over Pan American-Grace's South American west coast route.

That's about a day from the old schedule. Two American services doing the east coast to Rio de Janeiro will be increased from once a week to twice a week.

June 20, American Airlines put the first of its new Douglas DST Flamingos into service on a non-stop New York-Chicago trip. Two round trips a day are being flown, with the schedule calling for a four hours and 45 minutes flight westward, three hours and 30 minutes eastward. The ships are carrying 140-passenger planes. When American's full complement of twenty of the big Douglas is delivered, the night DST's (deeper) will be transferred to the transcontinental and far west-night service. The rest will be used as day planes. Flamingos for the seven daily New York-Boston round trips are filled for twenty passengers.

July 5 marked the launch of 1,000,000 miles of flying for Boston-Maine Airlines. Since 1933, 15,000 passengers have been carried without accident.

Capital Airlines, Inc., has been formed at Boston to operate one round trip a day between Boston and Portland, Idaho. Flying equipment will be a Beechcraft.

Capital Airlines has added a 50th dollar mail trip on its Detroit-Buffalo route.

Personnel for passenger service between Chicago and St. Louis by way of Peoria and Springfield, Ill., has been granted Chicago and Southern by the Illinois Commerce Commission. One round trip daily is planned.

The ICC has managed for Boeing on Aug. 10 Delta's petition for an increase in mail pay. The case was originally scheduled for July 13. Also postponed, until Sept. 15, is the hearing on

Eastern's complaint that American was violating the air mail act by maintaining passenger service between Newark and Washington.

Hanford Airlines, control of which has just been bought by Thomas Fortune Ryan III, will put 18-passenger Lockheed Electras in service on its Kansas City-Twin Falls route, cutting two and a half hours from former flying time. General offices and shops have been moved from Sioux City, Iowa, to Kansas City. Officers of the company are A. Hanford, president;



SAFETY

The building shown was made of stone (left) which made it difficult to see without the aid of a telescope.

Thomas Fortune Ryan III, executive vice-president; J. W. Miller, vice-president and general manager; J. L. Collier, secretary-treasurer.

Detroit-Detroit Airways, of Detroit, has won from the JCC an increase in mail pay from 125 cents to 25 cents per airplane-mile over its 330-mile route.

Midwest Airlines Corporation, with headquarters at St. Louis, Mo., has been licensed to provide daily service between Billings, Montana, and Salt Lake City, and a connecting service between Billings and Denver. Maintenance base will be at Billings. Officers are: W. G. Palmer, president; J. C. McKeown, vice-president; H. Wald, secretary-treasurer; and Fred Wald, general manager. Maintenance

will be under the supervision of Ruckard A. Wald. Passengers will be carried at 30¢ by carrying 5,000 passengers over the Washington-Detroit-Michigan route, an estimate of more than 40 per cent over the rates of W. S. Woodward, operations manager, but that seven new relay stations, supplied by the ICA members, will be installed at Washington, Philadelphia, Cleveland, Detroit, Grand Rapids and Milwaukee.

W. A. Patterson, United Air Lines president, has announced that the company will purchase five additional Douglas DC-3's at \$105,000 each, bringing the total to 15. A sixth daily round trip schedule has been added on the east-coast coast-to-coast route

so as to avoid the danger of encountering the whole force in one spot. The Douglas base will probably not be finished before 1939. Although definite plans are not yet known, it is indicated that such base in all will be constructed, each designed to accommodate a small concentration of the entire air force.

Industry Notes

A factory tour shows increased production, expansion.

THE STEARNS AIRCRAFT COMPANY has recently delivered a fleet of Model 87 D1 advanced trainers to the Argentine. They are twin-engine biplanes powered by 420 hp. Model T1B Pratt & Whitney Wasp Jrs., and equipped with Hamilton Standard adjustable pitch propellers. Some are equipped with Edo floats for water service.

Up 181 July 1, Warner Aircraft Works had received orders for more than 1,000,000 hp. from about 1,500 Cyclone and Whirlwind engines. Of these, more than 1,000 were Cyclones—412 of them the new 1,000 hp. Gs for modification to the 12 Douglas and 18 Stearns biplanes now building for the Army. In civilian use, at least 40 of the Gs will go into American Airlines' fleet of 28 Douglas Fairchild.

EARLY AIRCRAFT STRUCTURES have moved their shops from Glendale, Cal., to their own building in Tazewell. The first of two wings, including spinning machines, drop hammers, and power lathes, have been set up. It is planned to install additional machinery to take care of increased business.

THE STEARNS-FAIRCHILD AIRCRAFT CORPORATION has been licensed in San Francisco, Cal., to manufacture the advanced Model V, one of the planes being tested by the Development Section, Bureau of Air Commerce, as the Bureau's quest for a safe, inexpensive plane for large-scale production.

During the preparation at Data 3, Tazewell, Lloyd Stearns, and Samuel Metzger.

SEARNS AIRCRAFT is completing work reports from those countries will select specific plans to China, Brazil and the Argentine. To China will go an amphibious biplane, to South America a modification of the amphibious plane ordered by the U. S. Army

Orders, Organization

50 Consolidated for Navy. Army orders ships from Curtiss, Lockheed, Stearns. Air base for Alaska

THE NAVY continues to be going in for biplanes. In June 1938 five biplanes and four bombers were ordered from Curtiss, Lockheed, and Chance Vought. The last month's order for 80 Boeing biplane bombers (VBT), at a total cost of \$1,000,000. It was Consolidated Aircraft, already building 60 of the XP3T type flying boat for the Navy. Single biplanes for the Navy biplane have not yet been specified by the Navy.

The month's Army orders were more diversified. July 23 Assistant Secretary of War Woodring announced the purchase of a \$1,250,000 contract to Curtiss Aeroplane and Motor. It calls for an "amphibious machine" "adapted to provide for a four-engine service" of Curtiss V4B, biengine, all-metal, medium-wing aircraft. It will provide for a four-engine attack. They are said to be the world's only two-engine attack. Weight 1,000 hp G-Cyclone (page 37) will provide power. Landing gear is retractable. The War Department's release says it is "generally credited with being the fastest two-engine military airplane built to date."

The second Army order went to Lockheed and was for three Electra, at a cost of about \$100,000. They are

scheduled for delivery in August and September. Order No. 3, in the series, to Stearns was for 30 primary trainers, at a cost of \$125,000.

Another Army order of interest concerns the Wilcox field, passed more than a year ago, to establish an indigenous number of air bases about the country. They would be to permit rapid mobilization of a Department 1,000-plane air force. The Army has set up a board of these officers to select a site for the first of them, base near Fairbanks, Alaska. The board consists of Lt. Col. William A. Davidson, Quartermaster Corps; Major Otto G. Trevel, Air Corps; and Major Alvin L. Pines, Medical Corps.

They will be supplied with plans of the largest desired and other detailed information. Proposed time to be completed will be the building of an adequate foundation to withstand the heavy pounding of landing bombers. The Fairbanks base is considered to be a branch of the general base for the northwest, as yet unselected. It will form an Alaska central supply depot for fuel, ammunition, and services. Though plans will probably be based on a standard aircraft, the board will consider the different divisions of the GHQ Air Force,



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Across THE SPEARHEAD OF THE WORLD



Flying the trans-Andean route between Santiago, Chile, and Buenos Aires, in the Argentine, is but an incident in the log of Pan American Grace. * Across the spectacular stretch which lies in the shadow of the highest mountain ranges of the Western Hemisphere, Pan American makes the run in five hours. * In Douglas more speed than has ever been offered in trans-Andean routes. * Douglas Aircraft Company, Inc., Santa Monica, Calif.

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WHEREVER YOU GO... TRAVEL VIA LUXURIOUS DOUGLAS EQUIPMENT
IN AMERICA... On American Airlines, Inc. — Eastern Airlines
Pan American Airways — T. W. A., Inc., and Western Express
Airlines Ltd.
IN THE ORIENT... On Royal Air Transport, China National Aviation Corporation, and K. N. S. S. in the Netherlands Indies.
IN SOUTH AMERICA... On Pan American Grace Airways.
IN EUROPE... Deutsche Luftreisen in Germany, K. L. M. in the Netherlands, A. F. P. in Spain, A. O. T. in France, C. L. in Switzerland, Air France in Italy, and Air France in Switzerland.
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TO RIGID AIR LINE SCHEDULE

Roebing has pioneered in the development of Wire Aircraft Products

TODAY and since the inception of the aviation industry, Roebing keeps up with an industry whose constant watchword has been Progress. Most principal plane builders now turn to Roebing for the solution of their wire and cable problems. And as the years to come Roebing will continue to pioneer in the improvement of wire aircraft products.

Roebing Wire Aircraft Products include—*Tinned Aircraft Wire, 12-strand Aircraft Strand, Tinned or Galvanized Aircraft Cord (R-7, R-8, R-15), Tinned and Galvanized; Ferrules and Thimbles, Servicing and Lashing Wire, Control Strand and Gages; Electrical Power and Lighting Cable; Gas and Electric Welding Wire.*

John A. Roebing & Sons Co., Trenton, N. J.



ONLY A FINE PRODUCT MAY

BEAR THE NAME ROEBLING

Last month an order for 400 Can-Amair 4-B-3 motor for the Taurus Aircraft Company was announced. This month an order more than twice as large—for 1,050—is recorded. Fifty of them will be equipped for experimental purposes, with 1,000 ignored.

Can production for the year is scheduled around 500. In the first six months of the new model was in production—From Feb. 1 to July 1—211 Can-Amair 4-B-3 of the production lot. This easily equaled 1934's output of 208 planes, which was 25 per cent of all experimental planes produced. This year's July production totaled 29, all that were produced in the whole year of 1934.

RANGER ENGINEERING CORPORATION, of Pennsylvania, N. Y., has launched a production program for 200 of the new 145 hp. Model 6-300-D Ranger engine, an improvement over the B model, of which 25 were produced last year. Total production will go to the Fairchild Aircraft Corporation, of Hightstown, N.J., for installation in the 1935 Fairchild III.

UNITED AIRCRAFT CORPORATION has 4750 employees on the payroll, as compared with 3800 a year ago.

R. D. DeWane, president of the American Aircraft Corporation, has announced a record of seven million miles flown in Stearman Helicopters in the first six months of this year without a single fatality to pilot or passengers.

Lockheed Aircraft, Ltd., has ordered two 75-passenger Lockheed Starliners for experimental flying prior to the setting of standards for trans-Canada mail service. The ship cost about \$100,000 each. Another Electra line goes to the recently reorganized Standard Airlines.

Commercial production was scheduled to start early in July at the Aéroplane & Motor Corp. plant in London, Neth. Avenue Model F, ATC 402, for which was ordered last April, is powered with a modified Ford V-8 engine delivering 82 hp. According to R. H. Wade, executive vice-president of the company, a production schedule of four planes a day will be reached by fall.

The Summer meeting of the Mass. Aviation Committee of the Air Transport Association was held July 9, 10, 11 at the Hollywood Plaza Hotel, Hollywood, Cal. It was characterized by TWA's maintenance chief, W. A. Blumhagen. The committee's secretary is Fowler W. Barker, of the A. T. Co. Recently there were said to have several months of organizing, the Alliance, Ohio, Chamber of Commerce has secured for TALLMOUTH AVIATION COMPANY the 60,000 ft. factory in Alliance formerly occupied by the Army Airplane Co. There the company is being set up with Mr. Taylor at its head, R. W.

Talbot as production manager, and L. W. Salsbery in charge of molding. Plans, equipment, plant and parts programs have been moved to the new location, and facilities for production are ready. The TALLMOUTH is a single-engine, side-by-side high-wing monoplane powered with a Continental motor. It will sell for \$1,995 and a number of orders are reported.

To power Douglas bombers, the War Department has ordered 100 Wright Cyclone R-3084 engines rated at 1,000 hp at 1,600 rpm (see page 47). Total contract price is \$1,227,790.

Further, Faster

Army flies capture amphibious distances; Italian claim credit

Two TAI amphibious records left indelible an attack by the Army Air Corps June 26. In a 1,425 mile non-stop flight from San Juan, Puerto Rico, to Langley Field, Va., Maj. Gen. Frank E. McKey, commander of the 32nd Air Force, and Maj. Gen. Frank E. McKey, commander of the army's second corps area, broke by nearly 400 miles the record set last January by another Air Corps plane of the same type—a Caprine-powered Douglas O-47 amphibian. The trip, against headwinds, was made in eleven hours, nine minutes. Second record for the flight was the 1,000 kilometer speed record established by Henry Reimschuessel in February, 1935.

A few days later an Italian announcement claimed right world aviation records, set in a two-engine Curtiss X-26. The records are a speed over 1,000 mph, 2,000 kilometers (1,240 and 1,242 miles) course, empty and with loads of 1,124, 1,236 and 1,400 pounds; they showed 160 mph over the 1,000 kilometer course, 394 mph over the 2,000 kilometer course.

In the female category, Miss Margie Hale, flying a Puma 30, broke last the British man's and woman's world altitude records at Villacoublay, France, June 25. She reached a height of 49,940 ft. The man's world record is held by Reimschuessel, of Italy, at 47,152 ft.

Calendar

Aug. 1—Winston, Kansas Board Air Show, Topeka, Kan.
Aug. 2—Winston, Kansas Board Air Show, Topeka, Kan.
Aug. 3—Winston, Kansas Board Air Show, Topeka, Kan.
Aug. 4—Winston, Kansas Board Air Show, Topeka, Kan.
Aug. 5—Winston, Kansas Board Air Show, Topeka, Kan.
Aug. 6—Winston, Kansas Board Air Show, Topeka, Kan.
Aug. 7—Winston, Kansas Board Air Show, Topeka, Kan.
Aug. 8—Winston, Kansas Board Air Show, Topeka, Kan.
Aug. 9—Winston, Kansas Board Air Show, Topeka, Kan.
Aug. 10—Winston, Kansas Board Air Show, Topeka, Kan.

Financial

Capital expansion. Profits for Bendix, Boeing

BENDIS AIRCRAFT Corp. directors have approved a reissuance plan for approximately \$500,000 in new working capital for 1935. The plan is to issue new stock which will be used in exchange for present preferred and common stock. The company, organized a year ago, has 18,000 shares of \$100 par value, of which it has issued 450 shares at the old Consolidated Aircraft plant at Redford.

Bendix & Barney Director Fund Corp. (Grand Rapids, N. Y.) has filed a petition for incorporation. Assets are valued at \$175,750, including \$100,000 in preferred, and \$75,750 in common. Capital stock consists of 1,000 shares of 5 per cent preferred, with a par value of \$100 each, and 100,000 shares of common, with no par value.

Consolidated Aircraft is offering exchange rights in stockholders of recent July 15. Their value preferred stock at \$50 a share, will be available in the ratio of one share for each 25 shares of common now held. The rights expire Aug. 14.

Douglas Aircraft is offering 50,000 shares of new capital stock to holders of recent July 15, at the rate of one share for each five held. The price was \$10. Stock not subscribed when the rights expired Aug. 3 was offered to the public by underwriters.

July 6 Ford-CO Aircraft and Tool declared a 15 cent dividend, the first since July, 1930. Profits for the second quarter of the year, ended July 31, amounted to \$1,000,000 in 14 cents a capital share. This compares with a \$1,114,167 profit for the same period last year.

John H. Gross, president-treasurer of Lockheed Aircraft, has announced that about 98 per cent of the 63,534 shares of capital stock offered through rights have been subscribed, increasing the company's stock reserve about \$100,000.

To provide new working capital for Severely Aircraft, J. A. Sano & Co. are offering 200,000 shares at \$1 par value common stock for \$175 a share. The stock is part of an issue of 600,000 shares. Severely reported a loss of \$5,905 for the four months ended Aug. 31.

Second quarter profits for Bendix Aviation and its subsidiaries amounted to \$1,005,740, compared with \$897,644 a half year ago.

Another company to show a second-quarter profit was Boeing, which reported a profit of \$119,982 before provision for federal taxes on consolidated earnings. In the same period last year amounted to \$224,595.

**UP
TO THE
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In attaining high altitudes aircraft engines are subjected to tremendous loads and stresses...to radical changes in temperature. Hence vital parts of these heavily burdened power plants must be endowed with super toughness and super strength.

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Schools, Services, and Airports

A state-by-state tour of the flying fields

• **ALABAMA**—Alabama's first Annual Air Carnival, June 6-7, drew 10,000 spectators the first day. The Birmingham Aero Club turned over a \$500 profit to the city. Money is contributing \$10,000 of WPA support expenditures, including additional runways, lighting and other items of the administration building.

• **ARIZONA**—The WPA is installing an air radar at Nogales to indicate the direction to the airport.

• **ARKANSAS**—A three-day air show, sponsored by the 14th Observation Squadron, was held at Little Rock Airport early in July. Concurrent with the show, the squadron's new hangar was dedicated.

• **CALIFORNIA**—At an air show featuring parachute jumps was scheduled early in June for Alhambra Airport, Riverside. The Boardman Chamber of Commerce is conducting the erection of a radio marker beacon at Keeser County Airport.

The WPA has allocated \$25,000 for an improvement project at Oceanside Municipal Airport. One project calls for construction of additional five control rooms, the other for cleaning, leveling and varnishing a 500x3,000-ft. runway, and relocating present boundary lights.

The Anaheim County Club of California, Inc., conducted an air tour from Los Angeles to Santa Ana in May. Forty-one planes and 131 people participated. Winner of first prize in the November 25th Century Tour was 361st Fighter Group, who flew a Boeing Stearman. The group, from the 44th Fighter Group, has gained several victories, including a record of 100 victories in the Southwest based at Grand Central Air Terminal, Oceanside.

• **CONNECTICUT**—The proposed Connecticut Aero Club, at a meeting in Hartford late in June, voted establishment of a public airport in the city. Club president W. Parker Bailey. The Bureau of Air Commerce has given final approval to a \$100,000 WPA project for construction of an administration building at Bradley Field, Hamden. It is the second part of a three-phase program for rehabilitation of the field after the spring floods.

• **COLORADO**—The Bureau of Air Commerce will establish an emergency landing field on 112 acres of land 9 miles west of Greeley which it has leased.

Scott V. Winkler has been named manager of the Colorado Springs Municipal Airport, in assistant Max Hyde, who resigned. Winkler holds both a transport and a commercial license.

• **DELAWARE**—A radio beacon is being installed at the Du Pont Airport, Wilmington.

The Delaware Air Service, Inc., has established an airport at Kilmersno, Delaware, and has erected a hangar and office. A Taylor Cub will be used for student instruction. Air Service, Inc., has erected a new hangar at Bolinas Field, New Haven.

• **FLORIDA**—At the annual meeting, late in June, of the Miami Aero Club, the following officers were elected: president, Arthur E. Curtis; vice-president, Lester Steyer; treasurer, Roger Chabers, secretary, D. Van Dyke. The club is considering acquisition of its 45th place. Miami is considering enlargement and improvement of the Miami Municipal Airport. Included in present plans is an addition of 700 acres and widening of highways between city and airport.

• **GEORGIA**—Improvement work at Savannah Airport is reported well advanced. Airport is being spread on the Milledgeville. Later runways and a hangar will be constructed.

• **IDAHO**—Bureau is considering construction of a sub-super airport with WPA funds.

The WPA has released \$24,000 for improvement work at Boise Municipal Airport. Principal item will be a new hangar large enough for three planes. J. R. Johnson, Joseph E. Johnson, and J. Ward Arney have formed a company known as Air Transport, Inc., at Coeur d'Alene. A Bellanca will be used for passenger and freight transport. 74th Air Base.

• **ILLINOIS**—Milton Wright, Stanley Klinek and Frank Fleck have established the Lake Springfield Airport, Springfield. East-west and north-south runways have been constructed, and a hangar is also planned. Klinek, who is chief pilot at the field, and Wright will use their plane for student instruction, and Fleck will bring his Taylor Cub to the field. Stand before have been modified at the Duquoin Municipal Airport by the night club owners who larger than planes at the field. The stand before of a single plane is already



VACOS LINE UP

at Union Air Transport, Northbrook, Ill., where all kinds of them, probably around the regularly hangar.

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Aviation People

Who's who and what they are doing

• **ARRIVED**, proudly reviewing twenty years of aeronautical progress in this state, passed in tribute to Earl L. Orvington, we said, paid No. 1, who died on July 23rd. On September 23, 1911, Orvington pulled up the first sack of air mail at Garden City, L. I., ten minutes later issued it from his *Glenn* when *stay-at-home* Blander to the waiting postmaster at Mineola, L. I., ten miles distant. Then was put into practical operation the first delivery of mail by air. Graduated from MIT in 1904, Orvington's flight training was received at the *Robert School* in France in 1911. In 1909 he won a \$30,000 prize for a 146-mile cross-country dash from Boston to Providence and return. During the World War he served with the Navy as Lieutenant Commander. His later years were devoted to consulting engineering and he was owner of the Orvington Air Terminal at Santa Barbara. A founder of the *Early Days*, he was also a member of the QRB and National Air Pioneers Association.

• **CHASLES W. FRANCE** has been elected vice-president and general manager of Cessna-Wright Corporation following full charge of the St. Louis plant. Mr. France's first acquaintance with the Wrights began in 1914 when he was sent to the Wrights' Royal Flying Corps during the War but soon back to aviation in 1925 to Division Superintendent of Western Air Division. In 1934 he became operations manager for Eastern Air Lines, first at Atlanta, later at Miami, resigning to accept his present post.

• Upon resignation of Charles W. France as operations manager for Eastern Air Lines, Sidney E. Shuman was appointed his successor. A baronet in 1926, Shuman later found his way to aviation, joining *Passion Aviation* in 1929. He steadily advanced until that company was absorbed by Eastern Air Lines, becoming superintendent of the Northern and Eastern division of the line now an operations manager with headquarters at Miami and Newark. His present job is taken over by George E. Gardner who has previously been superintendent of the Western division. Previously he had been concerned with the Department of Commerce.

• **FARRELL** AVIATION CORPORATION's newly appointed director and vice-



Zeph Grinnell



Richard B. Smith

president, Col. Virginia E. Clark, retired an chief aeronautical engineer of the U.S. Army aviation years ago. Since then his design have been many Army and Navy assignments, and his efforts have been utilized in a large proportion of American planes, including record-breaking ships. Upon retirement from this Army he joined the Dayton Wright aircraft plant controlled by General Motors, and in 1932 became vice-president and chief engineer of the newly organized Consolidated Aircraft Corporation.

• Upon resignation by Commander Winthrop Coghlan of his duties as executive officer at the Naval Air Station, San Diego, Capt. Arthur E. Hinde, formerly director of the carrier *Gangway*, succeeded him as executive officer of the air base.

• **WILLIAM L. SOUTHWICK** has been elected vice-president, director of publicity, of Bendis Products Corporation. Mr. Southwick is widely known in the industry through his many years connection with the publicity and exhibit activities of the Bendis enterprises, notably the Bendis trophies.

• A familiar figure about the Washington office of the Aeronautical Club of America, Louis Emmons is now to be found behind a desk of the National Consumer Commission, Code Authority for the commercial aviation industry during the interim-time NCA, he had also actively

assisted Towler W. Barker, secretary of the Fixed Base Operators and Airport Committees of the Aero Chamber, in conducting nation-wide conference of airport and fixed base operators held during the summer of 1935. Recently he has been engaged in a study of spending and emergency legislation for the Chamber. Prior to joining the Chamber he was secretary of the Independent Operators' Association.

• **SHIELDS** in the publicity field: Richard B. Smith, former Aircraft Company in United Air Lines, at Smith, Harold Muschell, formerly with the Seattle Post Intelligencer, takes his place at Boeing.

• **RENAME** of Air Commerce has lost Inspector James N. Peyton to TW-4. Peyton is now a first officer with the age line, having formerly been stationed at Oakland Airport where he conducted flight tests and made annual inspections of airplanes. He is not new to commercial piloting, having flown the route between Montreal and New York in 1925.

• In recognition of the growing importance of its sales department, American Airlines has placed Maxine D. Hixson in the new post of vice-president in charge of sales, with headquarters in Chicago. Mr. Miller general sales manager for the past year, has also been named to the board of directors. He was at one time professor of business administration at the University of Texas.

• **DECEASED** equally between the American Rocket Society and Allied Aircraft, is vicepresidente, is the Republic Prize of \$2000 honor awarded by the Aeronautical Society of France. The Society was its share by reason of great interest made under the direction of John Stennis, president, terms which were developed a successful rocket motor and a successful method of launching liquid fuels in rockets, also for shooting the first model to attain a speed of 700 m.p.h. Mr. Stennis' contribution was the completion from the tests of three improved rockets which were now recognized as a basis for calculating performance of rocket motors, and the designing of a rocket test machine at altitude of 75 miles.

• The first technical meeting on production problems to be held by the aircraft

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*View of Flowmeter Indicating Dial
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